Camp craft

Warren Hastings Miller

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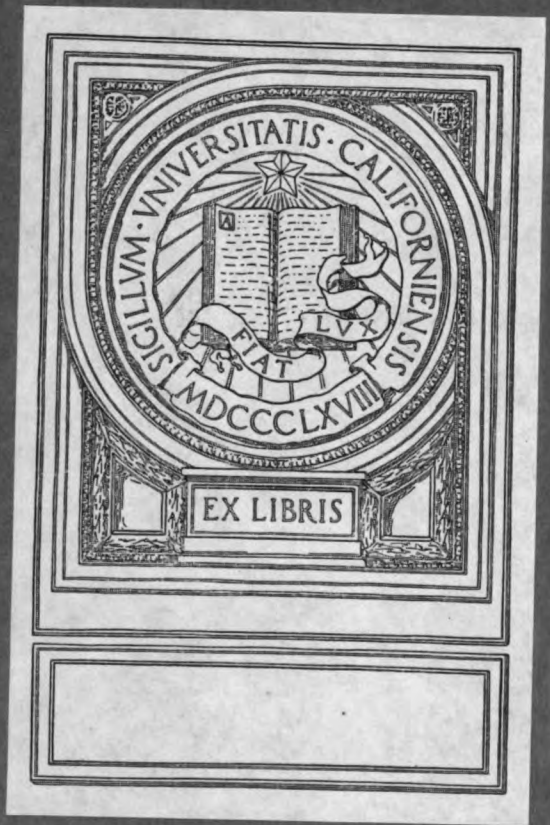

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FORESTER TENT DESIGNED BY THE AUTHOR.

The picture shows Daniel C. Beard awarding this tent first prize in a Camp-Fire Club encampment.

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CAMP CRAFT

MODERN PRACTICE AND EQUIPMENT

BY

WARREN H. MILLER

EDITOR OF "FIELD AND STREAM"

WITH INTRODUCTION

BY

ERNEST THOMPSON SETON

ILLUSTRATED

NEW YORK

CHARLES SCRIBNER'S SONS

1915

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Published May, 1915

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TO THE RED MAN,
WHOSE WOODCRAFT EXCEEDS OUR BEST
AS THE MASTER THE 'PRENTICE,
THIS WORK IS DEDICATED

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AN INTRODUCTION
BY ERNEST THOMPSON SETON

No one who studies man's beginnings in the light of modern research can doubt that Woodcraft was the earliest of our sciences. It was Woodcraft indeed that constructed man out of the crude and brutish stuff that was then the best live product of the earth. We can see a little of the process to-day in our children, just as we see the baby panther wear first the spotted coat of his long-past forebears, before he dons the brown of his older kin. And weightier yet it seems to me that Woodcraft, in its broad entirety, more than any other activity, is calculated to save our species from decay.

The Camp Life is the climax of all Woodcraft, and the man who leads us there—who blazes the trail, who teaches us the fords that grow less fearsome as we follow—is a heal-worker for our race.

Many a man and woman, I have heard say or imply, that they "would like to go camping, but they are *afraid*." Of what? Vague fears of animals? Unknown terrors? or very definite fears of hardships that they believe are an essential part of it?

They are not well informed. The blue sky life is associated with some mighty benefits, and some

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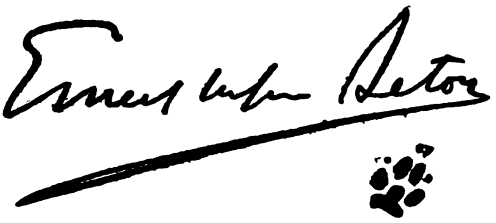
real dangers. The wise aim at getting the first and avoiding the second. The benefits are beyond question—all the glorious purification of sunlight, the upbuild of exercise with the zest of pleasure, the balm of fresh air at night, the blessedness of sleep, the nerve rest, and change of daily life. The dangers are—rheumatism from improper beds, digestive trouble from improper meals, and minor troubles from insects or improper indulgence in the sun-bath, or exposure to weather stress.

These are the real dangers (there is no danger from animals), and the man who shows us the simple, effectual, inexpensive ways of winning all the joys, and dodging all the sorrows, has done no small thing for his people.

This is the aim of "Camp Craft," and it is an open secret that for many years the author has in his own proper person, as well as among his many friends, tried out all the things he writes about—yes, many times—before offering them to the world as things of proven worth.



April, 1915.

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CAMP CRAFT

CHAPTER I

KINDS OF CAMPS

THIS good green earth on which we live is an immense place; how immense is not realized until one comes to walk across it or traverse it by any other primitive means of travel. The globe-trotter who races across it on express-trains little knows his earth underfoot. He sees something of the diversity of the peoples which inhabit the earth and notices some of their, to him, "queer" customs, but he neither perceives nor would understand the underlying causes which make for this diversity and compel these customs which seem to him so unusual.

But the woods cruiser, the pack-and-saddle explorer, the canoe voyageur, the dog-and-sledge traveller—he knows the earth! To him are plain the great natural conditions, differing all over the globe, which mould the life and customs of its inhabitants. To him even five miles of travel may mean a whole day's toil and struggle against head winds, adverse currents, and choppy seas, with a stop at noon to

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get lunch; whereas the same distance to the train traveller would be a mere detail, a few minutes, perhaps, between local stations. What does the tourist know of natural conditions that govern in the countries he passes over? What does he know of these great, primitive essentials of food, warmth, and shelter in the cactus deserts of Arizona, on the fir-clad slopes of the Rockies, in the spruce hills of Maine, in the piney dunes of the Atlantic coast, in the Laurentian wildernesses of Canada, and the snowy wastes of the far North.

But the explorer, the hunter, the fisherman who has matched himself against the wild environment of all these countries—he knows! He respects the bigness of the earth, even of such an infinitesimal inch of it as five miles of its contour. He appreciates why the people do thus and so in different countries, for he has felt the same conditions operating upon himself as the inhabitants live under. To the train traveller from New York to Seattle all the cities are much alike, it is only the countryside that is different; but to the outdoors man, oh, what a difference in the length and breadth of that 3,000 miles! The same equipment that is the acme of perfection in the Eastern woods will require adaptation to camping conditions in the Rockies; the latter equipment would need extensive modification in Arizona, while none of them would be just the thing for a coastal

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cruise along the great bays and sounds of the Atlantic seaboard. Why? Because the natural conditions obtaining are different. The climate is different; fuel, water, transportation, and food problems are all different, and these factors cause modification of the equipment to suit.

It is these things that make camping out in different countries so fascinating, and it is these conditions, also, that explain the amazing diversity of tents, packing and sleeping paraphernalia, and outer's tools offered by the various outfitting firms. There *is* no one best tent, nor pack-sack, nor canoe, nor blanket, nor axe, nor even hunting-knife!

It all depends upon where you are going and what you propose to do. But for each country and climate there is one kind of camp universally conceded by veterans to be the best within certain limited modifications. Every detail of such a camp, every article for the procuring of food, shelter, warmth, and transportation exactly fits the natural conditions obtaining; and if any part of the outfit is unsuitable or is omitted entirely, by that much does the camp fail to meet the existing requirements.

Let us, as it were, throw upon the screen some typical American wilderness scenery and discuss the types of camps that fit best into their environment.

Scene One. Most familiar of all, the hardwood and hemlock forests that clothe our Appalachian hills

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and extend westward to the prairies and north to the Lake States. A country of noble stands of oak and maple timber, with great areas of thick brush-land saplings, the haunts of grouse and woodcock; of placid and lily-padded lakes, where the fighting bass and musky lurk and wild ducks congregate in the fall; of brawling brooks and alder bottoms, where trout and white-tailed deer tempt the adventurous spirit in the frosty seasons. The spring and fall temperatures are comparatively mild, snowfall light, if any, and nearly every part of this country is accessible to team and buckboard by old, abandoned lumber-road routes.

These are the conditions; what of the camp? It is the beginners' country, the ideal for the man who cannot cook except in the most rudimentary fashion; who teams in a ton of things and forgets the salt; who totes 20 pounds of canned goods in a 10-pound wooden soap-box and brings in a 50-pound tent and 40 pounds of camp-cots and furniture to sleep two men; who is lost if a quarter of a mile from a lumber road and is frightened into lunacy if he happens to get left out overnight.

For him the heavy 10-ounce duck 9 x 15-foot wall-tent, with a fly over it and a board floor; a folding canvas camp-cot with two or three pairs of army blankets, some camp-stools, a cook-stove, a folding dining-table, a collapsible cupboard; all the rods,

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rifles, shotguns, ammunition, and tackle he wants; fresh bread and ham, canned vegetables and preserves; a folding canvas bathtub—you needn't laugh; these things are all comforts, and as the team brought them in to the camp site and can take them out again, it is the logical style of camp for a country with such easy transportation facilities. By establishing a camp kitchen, with a complete aluminum cooking and table outfit, a reflector baker, and some practical knowledge of camp cookery, a party of campers should subsist for months in such a camp with virtually all the comforts of home and the added benefits of sleeping and living out in the open.

This country is also the ideal for the go-light man, with his gossamer outfit, care-free and happy, with his whole hotel on his back, weighing less than 30 pounds. He is free to hunt and fish where he wills, to go where no blazed trails lead; he is never "lost," for his home is right with him, and he knows well that his few days' provisions are ample to see him safely to some settlement where further supplies can be purchased. There are any number of go-light tents and equipments, designed by those who have given the subject much study, and they afford quite as much real comfort as the caravan camp of the veriest tyro; but it takes an experienced man to manage them properly and get the maximum of comfort and independence out of them. The basis

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for such equipments is a light one or two man tent of fine water-proof fabric, weighing not over 4 pounds; a light all-wool blanket or sleeping-bag; the lightest of cook-kits, and a variety of wholesome and nutritious provisions which are light and compact and form the basis of many times their weight of cooked food upon the addition of water from the nearest brook and duly cooking. If the go-light man is hunting he has but one weapon; if fishing, one rod and a limited amount of tackle. A light belt-axe of the finest steel furnishes him with all the fuel, tent-poles, and stakes he requires, and his mattress is either cut balsam and hemlock browse or dry leaves and pine-needles.

His outfit overlaps into the sterner lands to the north; so we throw on Scene Two, the spruce and white-birch country of Maine, New Brunswick, Quebec, Nova Scotia, Ontario—anywhere in the growing range of those two trees. They do not thrive in the warmer climate of the hardwood forests; theirs is the country of long, cold winters, with the snow yards deep from November to April, where the principal hardwood is the yellow and the white birch, and the balsams, spruces, pines, and hemlocks cover the granite mountains—the land of the moose and caribou; of rivers that are but overgrown brawling brooks, with white water all the way down; of trout that are leviathan in size and omnivorous

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THE VREELAND TWO-MAN LIGHT HIKING TENT.

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in their tastes as to fraudulent flies; a country where roads are few and far between, where the blazed trail through the timber is the sole guide, and even a footpath is a boon. The temperatures are severe; the cold begins early in September, and the first light snows are on the ground before October. The summer is short and sweet, with the nights cold enough to demand efficient blanketing, and at certain seasons the insect life is such as to demand special preparation to withstand it.

To meet these conditions, to begin with, all transportation must be by canoe and shoulder pack, usually both, for every canoe trail has its portages. Wherefore we find two kinds of camps—the permanent log shack, into which the necessities of life have been laboriously packed by industrious guides, and the nomadic camp, much like the go-light equipment of the more temperate zones but designed to provide comfort under much sterner conditions. To save total weight carried by the party in such an equipment, the tent must accommodate at least four men, yet not weigh over 10 pounds. To meet the extreme cold of the spring and fall nights, ordinary army blankets will not do, as they make too bulky a parcel if enough of them are taken to insure warmth; wherefore the various styles of sleeping-bags, which are essentially a series of the lightest and finest all-wool blankets, with every superfluous

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inch of material pared away and the whole enclosed in a wind-and-water-proof envelope to prevent air currents drifting through the weave of the blanketing and stealing away the precious bodily heat. To meet the conditions of food supply with no available points of replenishment, enough must be carried to subsist the whole party, and this must be selected of the lightest and most nutritious of raw materials, with a good cook in camp to render them into palatable, wholesome, and sustaining food. A practical knowledge of woodcraft will be essential—not book knowledge, which is likely to have some essential detail hazy or forgotten, but the knowledge that comes of experience, of having done it before, again and again, so that there will be no failure this time; hunting and fishing knowledge that gets the game, so that there will be meat in camp, with none of the few opportunities to get it overlooked or bungled; knowledge of how to butcher and prepare the raw product of rod and rifle, of how to make the forest itself yield the major part of the comforts—for, rest assured, the necessities will weigh enough to tax the whole party's combined strength without adding anything in the way of luxuries. It is the country for the veteran woodsman, for the man who has already tried himself out and accumulated his experience in the easier schools of the temperate-climate forests.

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A CAMP FOR THE NORTHERN WILDERNESS.

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As regards the permanent camps, for the beginner they are the only solution of the problem in this country. Experienced guides have already looked after the essentials; all he has to do is to bring not too many luxuries along and be careful not to get lost.

Turning from this stern picture, the postgraduate school of Eastern woodsmanship, let us throw on a milder scene, Scene Three, the great salt-water bays of the Atlantic seaboard, where shore-birds and wild fowl are countless in their numbers, and toothsome and gamy salt-water fish are ready for your rod and line. A country of great stretches of open water, of vast green marshes backed by deep, piney forests, of blazing white sand-dunes and roaring lines of foaming surf. Except in the duck season the days are cool and the nights comparatively warm, that is, a single blanket suffices and most sleeping-bags are too hot. Transportation will be by boat or decked sailing canoe. The ordinary open canoe, so essential in the wilderness streams and lakes, is out of place here, as both wind and wave are too severe for it to live, and one's progress is continually interrupted by being wind-bound. It is almost impossible to paddle against such a wind and sea as gets up daily on these great bays and sounds, and the water is too deep for poling, wherefore the open rowboat, the sailing sneak-box, or the decked

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sailing canoe which will live and thrive in a sea that calls for three reefs in larger craft.

Ashore the two big natural conditions are sand and mosquitoes. Sand drifts, blows, and gets into everything, and at night the mosquitoes are abroad in untold millions. Forearmed against these two evils, there is no better country to put in an outing, for the wild life is abundant, there are a thousand diverse occupations for an outdoorsman, and the climate is pleasant and agreeable. To get rid of the sand nuisance the tent should be of the closed type, with ground-cloth sewed fast to the bottom of the walls, and a high canvas sill provided at the opening, or door. Sand drops from your shoes whenever you raise a foot, but will run off in the act of stepping over such a sill, so that when you set foot in the tent you have neither kicked a spurt of sand before you into the tent nor drained a shower of it off your foot into it on entering. At that, quite a little will collect, and one's sleeping-rig should be raised a few inches from the floor by either a cot, or a mat of dried sea-grass, which latter can be had in great bundles along the bay shore.

The mosquitoes give little trouble during the daytime, but by sunset they are up and about, remaining all night and departing shortly after sunrise. These conditions make essential a fine mosquito-bar absolutely closing the tent and a camp régime that

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WINDBREAK FOR CAMP-FIRE AND TENTS ON THE SAND-DUNES.

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will be through with supper before the mosquitoes arrive. Also a tent big enough to enjoy oneself in when the whole party is gathered inside, either because of inclement weather or the mosquitoes. With such simple precautions, camping in this country is an enjoyable experience. Very little meat need be taken, as the supply of clams, crabs, fish of all sorts, and birds seems inexhaustible; the cook fire must be surrounded on three sides by a board windbreak, made of surf driftwood, to keep out blowing sand, and every cooking utensil in service must have a cover on it for the same reason. Avoid a tent that requires many poles to put up, for these are not easy to find along the beach; if camping up the estuaries and small sandy bays, with pines and hardwoods coming right down to the water's edge, this difficulty disappears.

For a lone cruiser or two canoes sailing in consort, perhaps the best tent is a canoe-tent, buttoned over the cockpit coaming, with the ridge-rope strung between the two masts. The canoe is hauled out on the beach and sand banked up around it; a mattress bag is filled with dry sedge or sea-grass and put in the bottom of the cockpit, and such a home is dry, warm, mosquito-proof, and quickly set up at the end of the day's cruise. The weapon to take on such a camp is a 12-gauge shotgun, with full assortment of shells; its weight does not matter in a

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sailing canoe with no portages, and a light, small-gauge gun has not the range needed for efficient game-getting. The rod should be a stout surf rod with a first-class reel and 300 yards of 18-strand line, a standard surf-casting outfit, so that when you tie into a 30-pound sea-bass or channel-bass you will not lose him. The weakfish and bluefish of both bay and ocean will be too light to give much sport with such a rod, but it is well to be prepared for almost anything when you cast your bait into the old ocean!

The last of the Eastern pictures now comes on the screen.

Scene Four, a wild river, flowing, oh, anywhere! —in the Laurentians of Quebec, through the green hills of the Alleghanies, or down in the cypress bayous of the Carolinas—it does not matter, so that it be a river with never a farm along its banks; and we are going 200 or 300 miles down it without expecting to see more than a bridge or two to remind us that civilization exists. In a word, a river to set the canoe voyageur's pulse beating faster and recall to him memories of that stout ashen paddle that in his hands drove the light birch-bark down hurtling rapids, past hungry bowlders, around down trees, over dams and chutes—all the thrills and excitements that make canoe travel a blessed memory.

What are the natural conditions to be met?

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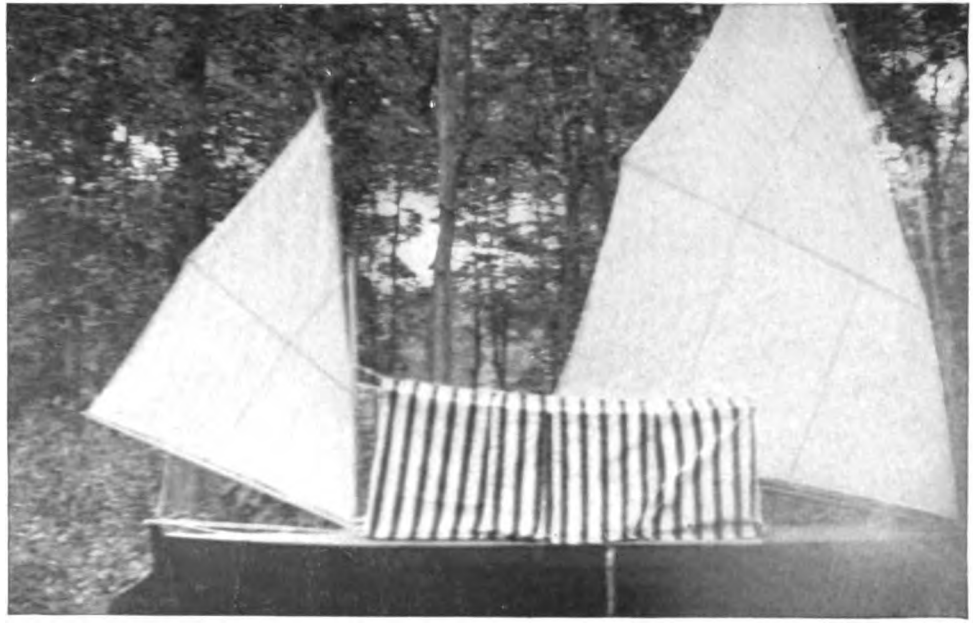

A CLOSED CANOE TENT FOR SALT-WATER CRUISING, WITH DECKED CANVAS CANOE.

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First of all, while the equipment does not have to be pared down to the fineness of a back-pack trip, it must be reasonably light and compact, say 50 pounds per man. There will be portages and down trees to get over, and unless you want to double-trip it, the duffel must be limited, as the canoe itself is no mean burden. This craft should not exceed 60 pounds in weight for the 16-foot size, and lighter preferred, provided that the river travel does not demand a stout, strong canoe to withstand man-handling over rocks. For absolute wilderness travel a heavy, all-wood canoe is needed, of the 18-foot size, and for any and all of them an efficient repair-kit and the materials to do with are essential. In the nature of things the tent should be light and easily and quickly put up, without too many poles, which may take a lot of time to find at the stopping place. The daily régime calls for breaking camp and getting under way by eight o'clock, an all-day paddle with a brief stop at noon for a lunch and a rest, and a definite stop about four o'clock to pitch camp, cook supper, and make all snug for the night. All the best canoeing is to be had when the nights are cold, for then the insect life, which is always abundant near water, has not yet begun to hatch out or else is frozen up for the winter. Wherefore the sleeping-rig must be comfortable and sufficient, some form of sleeping-bag preferred to blankets, and

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the same enclosed in a water-proof envelope or tump-bag, for the canoe is sure to ship more or less water during the day, and unprotected bedding will be found soaking wet when you want to use it. The foodstuffs will be light and nutritious, and are best carried in water-proof side-opening food-bags that will protect them against water in the bottom of the canoe, float them safely in case of upset, and yet deliver them handy to the cook when wanted, for the meals must be swiftly and efficiently cooked, often after dark, when things get lost easily if dumped out of an ordinary tump-bag near the cook-fire. One three-quarter axe should find a place somewhere in the canoe, as it will often be in service in clearing log jams and opening impassable holes in the bayous.

Of all wilderness travel the canoe camping trip is probably the easiest on the bodily muscles, for one sits down the major part of the day, and the exercise of paddling is never tiring enough to get that dog-tired weariness that comes from a hard day afoot or on horseback. Also for beauty and diversity of scenery, for continuous excitement with the natural hazards of the river it is hard to beat. The weapon to take is preferably a double shotgun, with ball cartridges for big game and a large assortment of sizes of shot, for it is almost impossible to get a rifle sight in a fast-moving, constantly turning canoe, whereas the shots that offer themselves to the shot-

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gun are innumerable and will result in much meat in the pot in the day's run. For a rod, either the bait-casting outfit or the trout-rod is the thing, depending on the waters canoed over. As there is little time at night to gather browse or cut it, some form of stick bed or stretcher bed is preferable, though, with a good acetylene camp-lamp, there is no reason why all the dead leaves, pine-needles, or evergreen browse wanted should not be obtained after supper before retiring. It is something of a nuisance to do this daily, however, and one way out of it is to fill your mattress bag once for all, and carry it full in the canoe as you go along. There is always room, and unless there are long portages, the added weight is not perceptible.

Our stereopticon now swings 3,000 miles to the west, and there develops upon the canvas Scene Five, in the heart of the Rockies. The forests are fir, balsam, lodge-pole pine, and spruce, with cottonwood as the principal hardwood, and the trails lead through them and out along great rocky slopes, with dizzy precipices awaiting him who loses the way. Then, up over snowy summits and divides, with perhaps a descent to brown bunch-grass prairie extending for miles. It is always windy and blowy, and the nights are cold and sharp, and with the opening of the big-game season comes the snow in generous layers, one or two feet thick, with now and

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then a blizzard thrown in for good measure. The distances are always immense, and there is but little navigable water to help out.

These are the natural facts and conditions to be met. How is man to provide himself with food, shelter, warmth, and transportation in such a country? To begin with, we want a tent, a whole lot of tent, not a shelter or an open lean-to, but the nearest thing to a canvas house for the whole party that can be provided. Now, a man can go afoot with a go-light equipment in that country—but he won't go far. There's a limit to what he can carry on his back, and the combined adversities of altitude and steep mountain trails set that limit at 20 to 30 pounds. Add to that the necessity for a warm sleeping rig, good down to 20 and 30 below zero, and you see why the foot traveller is limited to short trips of a few days' distance from the home camp. And as this latter must be located anywhere from 50 to 100 miles in from the nearest railroad, we begin to seek out a pack-horse to carry the necessary outfit. Such an animal will carry 120 to 150 pounds on his back all day long and subsist off the mountain meadow and prairie grass feed, with a little oats taken along for emergencies.

Now, here are the daily conditions: You are out hunting all day long, generally in the deep snow after October 1, and you come home at night dog-

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tired and wet through from your toes to your thighs. Nothing yet devised will keep deep snow from wetting you down in the long day's hunt. You then want a warm, closed tent, out of the bitter wind, where you can change your wet clothes, hang them up to dry for next day, and get supper. That calls for a wall-tent with a tent-stove in it, not an open shelter-tent with a dead fire in front of it buried under a foot of snow. You *can* use the latter, but the former is the logical outfit. As the party is usually not less than four—one horse-wrangler, one helper and cook, and two hunters—the tent should be big enough to shelter all of them; not less than 9 x 15-foot size, and of stout, water-proof duck, for any lighter fabric is apt to get torn when the pack-animal carrying the tent runs amuck in the tall timber and succeeds in ripping a hole in it by trying to squeeze between two spruces that will hardly pass one horse, let alone his pack! However, he manages it somehow, in spite of the frantic objurgations of all the men in the party, and comes through triumphant, with your silk tent torn to ribbons in spite of the protecting "tarps."

The tent-stove wants a bake-oven in it, and at least two pot-holes. Then, we must have rope for making temporary corrals, bells, and hobbles; a shoeing outfit; rope to hang wet clothes on along

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under the tent ridge-pole; and in general there is little gained in trying to save every ounce of weight possible.

On the other hand, all unnecessary luxuries must be left behind, for the essentials themselves weigh enough as it is without multiplying pack-horses. A party of four, each leading a pack-horse, can get along very comfortably taking all the equipment and provisions needed for a two to three weeks' trip into the mountains, and have horse-flesh enough to bring out all their heads and trophies at the end of the trip without having to walk. If the meat also is to be brought out, all hands will have to walk, and the saddle-horses take the meat. One haunch of elk is pretty nearly a load in itself. In such a country small game is abundant, and a pistol of some sort is needed to gather it in as one rides along. It ought not to be very long after arriving in the hunting territory before fresh venison and the meat of larger game is hanging up in camp, wherefore, outside of pork and bacon, the principal foodstuffs to be carried are nourishing cereals, dried fruits, sugar, evaporated cream, tea, and coffee. Also extra salt for preserving skins.

One's personal outfit should be very complete, not in luxuries but in essentials, such as a fine belt-axe, a keen skinning-knife, compass, rifle-cleaning outfit, medicine-kit, and above all a good emergency

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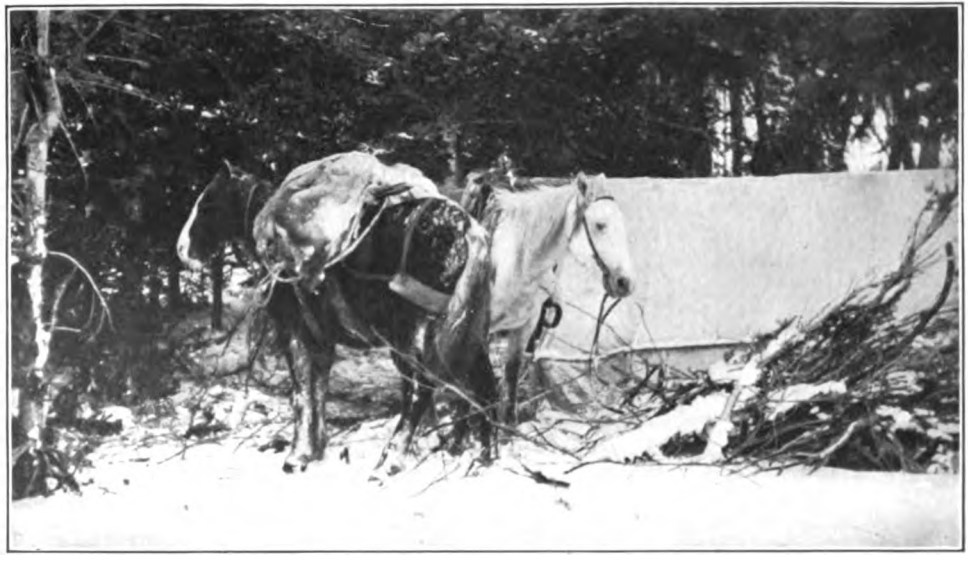

CAMP IN THE MONTANA ROCKIES.

The large wall tent is the only shelter for pack and saddle camping.

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ration in a tin container, that can be used in a pinch as a cooking utensil. Your chances of being left out all night are very good in that country; you may follow a hot trail until sundown before you catch up with your animal, and then you will most likely be lost as far as camp is concerned and have so much to do that it will be best to den up for the night right at the kill. Here is where the belt-axe, the skinning-knife, the emergency ration, and the compass all become essentials.

Swinging our camera southward for a thousand miles, Scene Six appears upon the screen, a limitless arid region, teeming with animal and vegetable life, even though no visible water is apparent. The roughest sort of bald, rugged, volcanic rock forms the going underfoot, and the mountains all about are made of it. The game is there, in those mountains, cougar and white-tailed deer, and the country itself is enough to tempt any red-blooded, adventurous man to match his wits against it, and get that game. It is a country of great purple distances, of weird and thorny vegetation, of endless level plains, always with a horizon of bare, craggy mountains or queer, flat-topped mesas. The days are scorching hot and the nights of intense, frosty cold; sometimes visited by heavy thunder-showers, occasionally by a rainy drizzle, but usually of a brazen blueness shimmering in the desert heat. An iron

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country, yet one fascinating to every outdoorsman who camps in it (not races across it in a high-powered car), who leaves the desert road and camps up in the hills and arroyos. If any tent at all is taken, it will be a closed one, for your cave-like, open tent is likely to attract all the reptilian life of your vicinity, who appreciate your warmth and your shelter but do not understand your sudden, startled uprising in the morning, and therefore bite. More often the wind-proof, rain-proof, and snake-proof sleeping-bag is the only habitation carried, and if it storms or drizzles, there is the "tarp" to pull over your faces as you sleep, all in a row with your feet to the smouldering fire, while the coyotes howl at you from the neighboring hills. As water is from 30 to 50 miles apart, it is obviously not the country for the foot hiker, unless he leads a burro with his camping paraphernalia, horse feed, and water packed on his back. The best way to live, move, and have your being in that country is riding a saddle-horse and leading a pack-horse, or a string of them tied tail to halter, depending upon how far you are going. Wood is reasonably plentiful, and sage for browse, so your pack-horse will carry your sleeping-bag, your extra clothes (sure to be wanted soon after sundown), your provisions, water-bottles, and horse feed (oats and bran to supplement the scant desert fare), and if you have a tent at all let it be a light

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one with either a canvas sill or a closed front and a ground-cloth sewn to the tent bottom, all around. Unless you are crossing a country where brooks traverse your trail, so that one cannot miss the water, it is essential to have a guide who knows the water-holes and "tanks."

Last scene of all, the camera swings 3,000 miles to the north, and there appears Scene Seven, a picture of vast, snowy wastes, over rolling country, with all trails hidden far below, and the going is by snow-shoes and toboggan, or sledge with a team of dogs for the motive power. In fact, in all countries where the trip is entirely over snow, no matter what its depth, a toboggan or a team and sledge with upstanders to steer and push on is an essential part of the equipment, for the cold is so intense that the sleeping-rig and outfit for any distance of travel makes a back pack out of the question. Of course, a short trip on snow-shoes with a knapsack and a light llama wool arctic sleeping-bag, light tent, etc., *can* be made, and the lone hike hauling a toboggan also answers for the transportation problem without any aid from dogs; but in the long run they are the logical answer, and have proven so all over Alaska, in arctic exploration trips, and wherever introduced in eastern Canada. The breed does not matter, provided they have thick, hairy coats and are naturally hardy—Airedales haul many a mail sledge in Alaska

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to-day, working right in with the native Malamutes; such a dog as the hound or pointer, with short, smooth hair would hardly answer. The harness developed by the Eskimos after centuries of usage is not at all what a white man would naturally cobble up if left to his own devices. It is simply two large loops of soft sealskin passing under the dog's fore legs and meeting over his tail in the trace knot. Joining these loops are two short straps, one passing over the back of the neck and the other tying across his chest when the harness is put on. So equipped, the dog can exert his maximum pulling strength, the pull to him being much the same as the shoulder-straps of a knapsack upon the chest and shoulder muscles of a man; he is free to pull in any direction, so as to turn the sledge without the harness chafing; he can fight, romp, wag his tail, eat, do anything he wants to without interfering with the business part of his harness, and it has but the one tie across his chest to put it on and take it off.

Except in extreme colds, where the snow igloo is the only thing, a dark-dyed spike-tent of light fabric is the standard equipment, so chosen because with a little ventilating flap at the peak it will sleep four men in a bunch, requires only one pole in a country where a jointed pole must be carried (there being no such thing as a tree of sufficient height to make one); further because this tent's steep sides make

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it shed snow easily with but a tap from inside, and still further because it gives the greatest enclosed cubic room for the least canvas carried.

For warmth, sometimes natural fuel can be had, but as a rule the spirit lamp and wood alcohol is relied upon as being quicker and surer, more especially as it can be used inside the tent, where any wood fire cannot because of the ground-cloth, which is essential in this kind of camping and is permanently sewed to the tent. With proper fur or wool clothing and wool sleeping-bag one is adequately protected against the extreme cold, and the principal thing to guard against for outside work on the trail is exposed metal touching the bare skin. Even the rifle barrel should be cord wound from muzzle to wood fore end, with its protective wood covering on the upper side of the barrel—this to prevent one's bare hand freezing to the barrel if inadvertently grasped when the temperatures are well below zero.

The foodstuffs to be carried on such a trip are such concentrated meats as pemmican and jerky, dried vegetables and soup-greens, which make fifteen times their weight of cooked food when boiled in snow water; erbswurst, the iron ration of the German army; tea and sugar—lots of the latter, for all outdoorsmen crave it when working hard in cold temperatures. Dried soup-powders, corn-meal, etc.,

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form the cereals, the object being to take along only that which cooks quickly, for fuel is precious, and anything that takes over half an hour to cook is too extravagant of the spirit-lamp supplies. For the dogs, dried fish and meat, one-ounce ration per pound of dog per day, must be carried.

Somewhat farther south, where the timber still exists, these conditions modify somewhat: beans and rice can be cooked from the natural raw article without precooking, as is done with the prepared powders; balsam and spruce are available for bedding, and one camps in a howling blizzard, cutting layers of their browse, which are first spread upon the snow and the tent set up on them, a camp-fire built on logs laid on the snow, and the teakettle (which is always carried alone and handy at the front of the toboggan) is put over to boil. A small folding tent-stove is set up inside the tent on logs or stones, and corn bread can be baked and meat fried, much as in camp life in the ordinary hunting zones.

To the camper who can travel and subsist under these conditions should be awarded the crown, for the least mistake in not making one's return cache wolverene-proof, for instance, or in letting valuable game chances slip by, may result in starvation, and loss of any essential part of the equipment may end in freezing to death. Only veterans should attempt

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it, for once well in 600 or 700 miles from a railroad and a goodly distance from the nearest Hudson Bay post, there is no turning back, and mistakes count for life or death.

Aside from the joy of visiting or exploring new country and seeing wild life in abundance, practically all that makes the winter camp and trail fascinating can be experienced in any of our northern forests, within easy reach of rail or trapper's cabin in case of misfortune. There is a zest and an invigoration about midwinter camping that puts it far ahead of the summer equivalent to many hardy souls well provided with the proper equipment, for all insect troubles vanish, no rainy spells intervene to stop all outdoor enjoyment, the going is pleasant and easy, particularly over the frozen and snow-clad surface of some waterway, and there is a sparkle in the winter air and a coseyness about a well-managed snow camp that no other season can give.

We hear much of the long-closed season, when the outdoorsman is cooped up in his office, but even if it be but for a few days, every outdoorsman should make it a point to spend some of his time under canvas during every month of the year—spring, summer, fall, *and* winter.

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CHAPTER II

TENTS

THE principal function of a tent is to make a real "woodser" of you. A shack or a log cabin, located in the heart of the woods, will shelter you from the elements and put you in reasonable touch with the sights and sounds and smells of the wilderness, but you are not of it, not in the real heart of the wild life, nor will a year in a cabin be as beneficial to your health as thirty days in a tent. The reason is that, day and night, there is a constant seepage of the fresh ozone of the forest through the texture of the tent wall, neither draft nor stagnation, but a constant change of air. The fresh, fine woods aroma is not barred out by log or clapboard, nor yet does it blow over you in chilling drafts as in an open-air bivouac or under a single sheet of shelter cloth. I never regarded the latter as anything but an unnecessary outdoor hardship, and the cabin I have always considered as anything but a luxury when there was a possible choice of a tent to sleep in.

Styles, sizes, and materials of tents vary greatly according to the climate, number in the party, and

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transportation possibilities. Every different style of going has its own best kind of tent, and this in its turn is modified by temperatures, wood supply, and available time for camp-making. There is a tendency among modern writers, following doubtless the lead of Nessmuk, to pooh-pooh the wall-tent as unsuited for anything but army conditions. But it is a significant fact that practically all the trappers, lumbermen, and herb men who live in the woods use the benighted wall-tent, and the Indian abandons his teepee for it just as soon as he can afford to buy one. Why? Because for a permanent camp it is the most practical form of shelter yet devised, and with a tent-stove and brush or snow protection it will defy cold better than any teepee or Sibley ever built. It is quickly and easily put up with a ridge-pole and a pair of shears outside—those who carry tent-poles do not know the game—it does not need any "fly" overhead with modern tent textiles, and for its weight it gives the maximum available cubic space inside. The commercial sizes of wall-tents run from the little 4¾ x 6½-foot affair for two men up to the 15 x 17⅓-foot size, taking five camp-cots along both walls. There are, of course, larger sizes for lumber crews, etc., but in camping-party sizes the 9 x 11, 12 x 14, and 14 x 16 about fill the bill. In water-proof flax their weights run from 19 pounds to 81, light green cloths weigh from 10 pounds for

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the 8 x 8 tent to 56 pounds for the 12 x 14 in waterproof duck. The above weight should convince you that the wall-tent is not the thing for back-pack trips, nor for one-night-stand canoe trips, nor for a nomadic pack trip for a hunting-party of six or eight men. A tent is an indivisible load, and in large sizes a very bulky one. With a boat, buckboard, or pack-horse to transport the tent, a large one for a party has the advantage that its stove will keep the chill off all night, and it is the thing to have for a permanent base camp of several weeks' duration.

The stove for it is of light sheet iron, in sizes 10 x 11 x 18, 10 x 11 x 25, and 10 x 12 x 32 inches. Weights run from 15 to 20 pounds. These stoves are regularly made without a bottom, being intended to be set on a stone hearth and to fold for transportation into a flat parcel. With them is furnished a telescopic pipe of five 2-foot lengths of sheet-iron pipe, the weight of which is included in the totals given above. It is essential to have a spark-arrester with it, for the sparks from a camp-stove are tiny hot embers, and will surely burn holes in the tent when they descend.

However, with a stove and a large wall-tent, a party of hunters or a man and his family are well fixed for comfortable living outdoors—better than the Indian is with his teepee, and far more healthily than the man in a mouldy log cabin or a drafty shack.

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The beauty of the camp-stove is that it runs all night. In principle it is a charcoal-making machine, with very little draft, and slow, steady combustion. You will have lots of difficulty with it on starting up for lack of sufficient draft, and the surest way to invite trouble is to fill it full of small kindlings and then touch it off, for it will at once smother itself because there is not enough air to support the flames. But go at it gradually, until you have a bed of live coals, and then you have an excellent fire for slow cooking, roasting, and baking, and you can feed it short logs *ad lib.*, with no necessity to be forever rustling small fuel as with the open camp-fire. At night fill the stove up with logs. The lower ones resting on the bed of live coals burn as fast as the limited draft of air will permit, while all the rest turn to charcoal and burn slowly in their turn. As this is a process of hours, the stove gives a steady heat all night, and is in fine shape for bacon and coffee and flapjacks in the morning.

Contrast this with life in the teepee in cold weather. I have often slept in them, the following experience being typical of a night spent in one: A sturdy fire, three times the size of a camp-stove, ate up a goodly pile of timber and maintained an acrid eye-watering atmosphere in the teepee, even though all its visible smoke was carried out by the draft cloth, which is arranged opposite the smoke flaps in every well-

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ordered teepee. About eleven o'clock the party turned in. By twelve the fire was down to embers, and cold blasts whistled up the draft cloth and out the smoke flaps. It was like sleeping in a chimney. My blanket bag was next the draft cloth and I got all the trimmings—maybe it wasn't cold! I'd far rather have buried the bag in a leaf pile in the woods outside. I got off to sleep about 1 A. M., and was wakened by the honking of wild geese pitching down into the lake in the dark before dawn. Orion had swung around, and I could see the whole of him through the top of the teepee. The cold of space radiated straight down onto us. You might as well have slept outdoors! The temperature was about plus 20, and there was ice inches deep in every pail in the teepee, and the fire had turned into a dead-white heap of ashes.

It was very poetic, of course. The Red Gods loomed large overhead, and their voices echoed down the lake in the stentorian honking of the Canada geese. We were living in the red man's home since time immemorial, on ground where trod Uncas and Chingachgook and Quonab. They probably slept under piles of caribou skins. I was using a blanket bag that I know is comfortable at plus 2, provided that you keep drafts off it, but in that teepee the bag was cold at plus 20. Two weeks later the same party were out in a white man's wall-tent 14 x 16

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AUTOMOBILE TENTS DESIGNED TO FASTEN TO CAR FRAME.

THE RED MAN'S TEEPEE.

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feet, with a 10 x 11 x 25-inch stove—and life was worth living again!

For a nomadic moving camp, or one reached by canoe or pack tramp, the style of tent changes. You want something light—not over 5 pounds for a capacity of two or three men, and if there are six in the party, take two tents. These can be had in closed and open types, 7 x 7 feet and 9 x 7 feet being the popular sizes. Weights run from 3 to 11 pounds in modern tent textiles. For a hunting-party of four men, I should consider a 7 x 9 Baker shelter-tent, weighing 12 pounds in balloon silk, to be a good investment. It has become standard for north woods and Canada hunting and fishing parties.

Even though drafty, cold, hard to put up, hard to keep insects out of without a bulky roll of bobbinet big enough to cover the entire front, it has much to be said for it. Its front veranda makes a night fire in front a long-distance proposition, and to trench it properly is not an easy matter on the average wilderness camp site; yet, with these known ailments, it has the undeniable advantages of quickly and easily sheltering four men and their duffel, with headroom enough to stand up in or sit down in on camp-chairs (if you insist on that kind of comfort); it does reflect the camp-fire heat-rays, and if it rains you can rig out the front fly and have a comfortable sort of porch to lounge under. In a snow-storm

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unless some one keeps the snow from accumulating, it will soon get you into a variety of troubles, due to the weight of the snow on the roof.

For pack tramp, canoe portage, and all types of travel trips, two or more open pyramidal tents of the Forester, canoe, or automobile type are preferable, for the same party can then separate to hunt or explore different territory in the same region, each pair, hunter and guide, taking a tent with them, and these small tents are infinitely cosier, warmer, less drafty and less trouble to put up than the larger lean-to or wall-tent. The weights run from 3 to 16 pounds, and floor areas about 8 x 8 feet. The automobile type requires a single 8-foot pole in front, and its rear corners are guyed out to the body of the automobile. The angles of side and back reflect the heat-rays fairly accurately, but with its front open it would be too roomy and drafty for winter camping. The floor space of the smallest size is 8 feet 9 inches by 7 feet 4 inches, with a rear wall 4½ feet high—a tent big enough to sleep four men and weighing 17½ pounds.

The canoe-tent is of much the same shape and uses a front pole with its rear corners guyed to high stakes. Its front pegs out round, but enough of the entrance flap can be thrown back to admit the fire heat-rays. Smallest size, 6 feet 6 inches by 4 feet 9 inches, floor area, with 2-foot back wall, weight,

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6½ pounds. It requires no front guy, as does the automobile type, because the pegs taking the front slope of the tent produce the necessary forward strain to counteract the rear guys. It takes 16 pegs.

Among the special forms of light camping-tents may be mentioned the canoe-tent with ridge-pole, the Vreeland tent, and the Camp Fire tent. The ridge type of canoe-tent is, in effect, an extension of the old style, the addition consisting of about a yard of material running up to a ridge instead of a peak. This ridge is held up by a short club by means of tapes, and a pair of shears is put up over the tent, with a short rope to hold up the ridge. The forward strain of the front face of the canoe-tent and the rear strain of its rear guy-ropes react on the club and shears to form a triangular strain which holds the tent up. It has somewhat more available space than the older form and considerably more headroom. It is made in sizes from 6½ feet by 4¾ feet up to 8 feet by 6½ feet, with weights from 6½ to 10 pounds. Sizes do not include circular ends.

Vreeland's tent is developed evidently from the Nessmuk shanty-tent. It is made in one size, 8 feet deep by 6 feet wide; height in front 6 feet, back 2 feet. It will sleep three men easily. It uses a ridge-pole and pair of shears, and the sides are guyed out by ropes, making the side walls very steep.

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The "Camp Fire" or "Dan Beard" tent is practically a wall-tent with one side sheared off about 2 feet beyond the ridge. The place of this side is then taken by a veranda flap, which can be closed down or else guyed out horizontally, permitting an open camp-fire in front. It has the advantage of plenty of headroom, besides being rain-proof. It is put up with two pairs of shears, ridge-pole, and high stakes for the wall guys. The smallest size made is 6½ feet by 4¾ feet, weight 5½ pounds. A larger size is 8 feet by 6½ feet, weight 10 pounds.

The Forester is the lightest and warmest of them all. I designed it ten years ago as a protest against the draftiness and lack of coseyness of the sheet lean-to. I wanted something in which *all* the walls of the tent would reflect the fire heat-rays down on the occupant. It is a well-known scientific fact that heat-rays travel through the air without losing appreciably of their warmth until they strike some absorbent or reflecting body. A flat, smooth surface like a tent wall will reflect a heat-ray without absorbing much of it, and the angles of the Forester were calculated with these principles in mind. The sincerest compliment ever paid me as to its warmth was on a hunting trip where three small open tents surrounded the camp-fire. The hound pack always collected in my tent—every dog of them, although a special bed had been arranged

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BAKER TENT IN SOUTHERN MONTANA. OWNED BY STEWART EDWARD WHITE.

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for them in one of the other tents, and they were perfectly free to occupy any one they chose. Returning home I would boot them all out and turn in, but in an hour they would all be back one by one, creeping in and curling up alongside my sleeping-bag. Those hounds had neither flattery nor criticism to offer, they were simply looking for the warmest tent!

To put up the Forester requires 8 pegs and 3 poles—a ridge-pole and a pair of shears. The ridge should be about 12 feet long and reasonably straight, the shears 10 feet and as crooked as you please. I never saw yet, in the U. S. A., a country where these 3 poles could not be had in any thicket in five minutes, and I have been camping steadily in the original Forester for over nine years. The ridge-pole passes down inside the tent and out through a small hole in the rear peak. You thrust this end into the ground and rest the other in the shears, peg out the sides, and the tent is up. Time, ten minutes. Some of the outfitters furnish it with tapes so that the ridge-pole can go outside. I do not fancy this as it destroys the stanchness and rigidity of the tent; there is nothing to tie your mosquito-veil to inside and no way to spread the tent inside in case two men are using it. In case I have a guest, I cut a hickory switch a yard long and slip it under the ridge-pole, and then turn it at right

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angles so that it will make a spreader, up about where your head will come. So arranged, there will be plenty of room for two sleeping-bags. The mosquito-bar is a 3½-foot triangular piece of bobbinet with a canvas edge along each side. It weighs 4 ounces and takes up about as much room as a sock. I fasten the peak of this on each side of the ridge-pole, about 4 feet from the rear peak, and peg down the canvas edges so that they fit snugly along the tent walls. The bobbinet has a gore let in the centre so that there is plenty of freedom to lift it up and then tuck it around the sleeping-bags after you are inside. Many's the night I have dozed off to sleep with a howling chorus of insects buzzing around just out of reach of vulnerable points of attack, with that little bobbinet triangle all that intervened between peace and misery! With the ridge-pole outside it would puzzle you some to work this scheme.

Attached to the front edges of the Forester is a hood which can be laced up at night. It does not entirely close in the front of the tent, as there is still a low opening for the fire heat to strike in, but it does prevent rain driving in and saves you turning the tent around or cutting leafy branches to prevent a driving storm reaching you, as I often did before the hood was thought out. It also holds the heat in the tent where formerly a steady flow of heat went out along the ridge. Some of the manu-

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facturers have added a sod-cloth. Why have this extra weight, bulk, and fussiness? Surely it's no trouble to bank up a few leaves or pine-needles along the sides after pegging down, not forgetting to throw on a branch or two to keep them from blowing away. Never carry anything into the woods that you can easily make with the materials ready to hand.

I have devoted this much space to the Forester because any one can make it of ordinary department-store 8-ounce duck, sewed up on a domestic sewing-machine, and get a serviceable, strong, weather-proof tent, weighing 6 pounds with the hood and covering a triangular floor space 7 feet 8 inches on a side. It takes 13 yards of canvas, and the angles are tan. 15 and tan. 8 for peak and foot. The height at the ridge and shears should not exceed 5 feet 6 inches when set up. I gave this tent to the outdoor fraternity over nine years ago. It is free to all, and I have no financial interest whatever in any of the various makers who are now selling it—in fact, only one of them has been man enough to even credit me with being its designer.

The closed types of tents offer a fascinating field for study and experiment. An open tent requires an all-night fire in severe weather, and such a fire one can get with an hour's work with a camp-axe, cutting twenty 5-inch logs 3 feet long, and building a Nessmuk fire with backlogs and andirons. But

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on hunting trips, where every hour of daylight is used in the pursuit of game and you come home too tired to do more than cook supper, to chop a supply of night wood is out of the question. You have, then, the other alternative—conserving your own bodily heat. A good sleeping-bag, not too heavy to pack on your back along with tent and provisions, will keep you warm, in a tight tent free from drafts. Don't worry about ventilation—there will be ample seepage of fresh air. A tent-stove using camp-made charcoal, 12 inches high and 12 inches in diameter, weighs 11 pounds and can be taken along and used as case for your cooking outfit; or a 4½-pound heater, burning specially prepared briquets lasting 10 to 15 hours, will serve to take off the extreme chill. A dozen of these briquets, weighing 7½ pounds to the dozen, cost seventy-five cents and will last for two weeks, and there is no smoke, flame, or gas to contend with. To my mind the best tents of this type are the Hudson Bay, Snow, and Miner's. The weights in modern tent fabrics run: Hudson Bay, 4 x 7 feet, 4 pounds; Snow, 6 x 7 feet, 5 pounds; Miner's, 7 feet 4 inches by 7 feet 4 inches, 7¼ pounds; Frazer, 8 feet 9 inches by 8 feet 9 inches, 10¼ pounds. These tents have the further advantage that one can stand upright in them, or sit down in camp-chairs or on cots during "enforced indoor weather" (whatever that may be), and are all the

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STYLES OF TENT.

1 Hudson Bay tent. 2. U. S. Forest service wall tent. 3. Hiker's lean-to 4. Western miner's tent.

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better for a bobbinet tent window in the back wall to afford a view.

However, there's no denying the convenience of a canvas veranda, and if you want a stretcher or stick bed in place of the well-filled browse-bag, you can have two cots very quickly by putting logs across the front and back of the tent, spiking to them straight poles, which are slipped through the pockets of the stretcher beds. But don't neglect even then a browse-bag, filled with an inch or so of dry leaves or evergreen needles. No canvas bed or hammock is warm or even comfortable without some sort of a mattress, and if you make it of nature's materials you have that much more blanket available to pile above you—which is always the coolest side. The so-called Snow tent resembles a Miner's, except that it has a short ridge which is held by a club and bridle outside. It thus has steep snow-shedding slopes, and considerable headroom, a desirable feature when one wishes to work indoors skinning and mounting specimens, making and labelling scientific collections, etc. It is best put up with two pairs of shears, supporting the club to which the ridge is taped. In Japanese silk, a 7 x 8 x 8-foot headroom tent will weigh about 6 pounds.

The Miner's tent seems to be standard for cold, snowy countries, where timber is scarce or wanting. Peary's parties used them throughout their expedi-

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tions, only abandoning them for the warmer Eskimo igloo during the long winter night. They used alcohol-lamps for warmth, and found the tent good down to about 30 below zero. Below that the igloo! It uses a single 7-foot jointed pole in the centre, and some manufacturers call for 24 stakes, which seems considerable of a hardship. The Miner's come in four sizes, from 6 feet 6 inches by 6 feet 6 inches up to 10 feet 3 inches by 10 feet 3 inches; heights 7 to 9 feet, and weights 7¼ to 12¼ pounds. The floor space is not particularly available, the headroom is restricted, and I should regard them more as a special cold-weather tent for special territories

And I have not much respect for the various outdoor sleeping-bags, hoods, and cubby-holes designed to take the place of the tent. A cold wind blowing over you all night will chill through the interstices of any of these, and their outside canvas always weighs more than a light tent. The weights run from 10 pounds up to 21 pounds, cover about 4½ pounds—most of them heavier than this. They, however, have an excellent place in the outdoor world—on a travelling saddle trip, where the horse carries your bag in a roll done up behind. At nightfall you can bed up almost anywhere in a sheltered nook or ravine, and if it rains or snows the bag will protect you. It is in no sense a forest home, never-

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theless, and the user misses many a pleasant memory of tenting by night with a cheerful camp-fire in front and the reflected heat warming him as he attends to the many little camp duties, comfortable and unhampered by heavy outer clothing, free to loll back in his warm, light den and smoke the pipe of peace while the flames mount higher and higher.

For such is the open-camp tent. Not a bivouac, but a forest home. Not a cold, chill canvas box into which you retire, to creep into an icy mountain of blankets, which you will be hours warming up, but rather—far rather—a bright, cosey retreat, with the warmth of the camp-fire penetrating to its farthest recesses; a place of jollity and good fellowship; a place where you can dream over the fire flames in comfort. To me the open tent with the backlog fire is the acme of forest life. I have camped in teepee, wall-tent, A-tent, shack, shelter-tent, lean-to, leaf pile, canoe-tent, and Forester, but my pleasantest memories cluster around the open-tent camps with a bright camp-fire in front. May there be many more of them for us all before we begin tenting beyond the Great Divide!

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CHAPTER III

ELIMINATING THE BLANKET

THE principal difficulty with the blanket is not its weight, but its bulk. It is not hard to devise a light, warm, water-proof envelope to sleep in, but when you come to pack it!—well, by the time it and your tent and your cook-kit are assembled and a mountain of assorted clothes, provisions, and dingbats are piled around these and rolled up in one huge pack-cloth you begin to look like the rear end of a moving van!

During twenty-seven years of camping, getting out on the average four times a year, I have studied the blanket problem from a number of different angles, and tried out nearly every form of blanket and quilt that has come into extensive use. One and all they seemed to run excessively to bulk. Take the army blanket, single thickness, 84 inches by 66 inches, weight 5 pounds. You may roll it into a sort of sausage, 7 feet long and 9 inches in diameter. To keep it dry you add a rubber protector also 7 feet long and 30 inches wide, weight 3 pounds, having straps and buckles at intervals to hold the roll in shape. What to do with this ungainly parcel

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is a problem. If you loop it over your shoulder, as was the fashion in the late, lamented C. S. A., there is no way to put a pack on your back to hold the tent, clothing, food, and duffel which you must also carry. If you bend it around your knapsack, as in the French army, the knapsack will have to be a mighty bulky affair to afford 7 feet of periphery; in fact, a European soldier in full campaign regalia is fit for little else than marching along a state road, certainly not for sustained wilderness travel.

The real wilderness travellers have solved the problem, after a fashion, by stowing the blanket in a tump-bag. There is just room left for a light tent, and in the other bag can go provisions and duffel. The two bags go side by side in a tump-harness, making a not overcumbersome back pack. But this is only one side of the story: arrange the blanket as you will, there is but one thickness around you, and this is not enough—not nearly enough—for comfortable sleeping with the night temperature even as high as 40 degrees. Below that you positively must have two thicknesses of blanket. So we get the red Hudson Bay blanket (with the four black bars!), 72 inches by 84 inches, weight 10 pounds, which can be doubled around one in a pinch; also the double mackinaw, 72 inches by twice 90 inches, weight 10 pounds, and the various gray doubles, usually twice 82 inches long by 72 inches

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wide. These all require a whole tump-bag to pack in, with precious little space to spare, and everything else you take must go in the other bag.

Now, in the summer, early fall, and late spring one can go as Nessmuk did, with a light knapsack and a single blanket, total weight, including canoe, not over 30 pounds; but I notice he usually denned up about the time the first snows fell. If he had stayed out later he would either have had to change his rig or increase his weight, and as soon as he got blankets enough his bulk would run out of hand for lone-wilderness tramping. As I try to get out at least once a month every month in the year, some sort of a winter pack that would be warm yet total under 35 pounds, including provisions, tent, duffel, and ammunition, had to be devised.

My earliest experiments were in the line of increasing the heat capacity of the single blanket. I bought the finest English all-wool steamer rugs and faced one with green galatea so as to add a thickness of sheeting to it, thereby materially increasing its warmth without adding appreciably to its bulk. Then I added buttons and buttonholes so as to make a sleeping-bag of it. Finally I added a light 8-ounce duck bag envelope, and it was reasonably comfortable down to about 36 degrees. Done up as an English shawl-strap, it made an impressive piece of baggage when travelling, and in the woods you

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folded it with the water-proof envelope outside and strapped it to the back of your tump-bag, à la Gardiner pack.

This rig even answered for hunting trips in November, provided that you built a night fire and got up at 1 A. M. and 4 A. M. to replenish it.

From time to time, since then I have camped with friends who owned everything from a 30-pound pneumatic sleeping-bag, cold at 40 degrees, to a 3½-pound Arctic bag of llama wool, good down to 34 below zero. They were all fine in their way, provided that you did not mind bulk and your purse did not shy at twenty-five dollars' to thirty-five dollars' expense for sleeping equipment. About as good as any of them was a plain wool quilt, costing three dollars at any department store and much used by miners and hunters in the Rockies. Lieutenant Whelen used one of these on many of his trips, he tells me.

Then Peary's experiments with fur, in his efforts to eliminate the sleeping-bag and reduce weight and condensation troubles, were published. Any fabric that will soak up and hold moisture will at once loose its heat-resisting capacity. Absolutely kiln-dry cotton is nearly as impervious to heat as wool. The figures are, in B. T. U. per square foot per degree temperature for non-conductors 1 inch thick:

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B. T. U. TRANSMITTED PER SQUARE FOOT PER HOUR PER DEGREE F.

Wool	36
Dry absorbent cotton	38
Raw cotton	46
Live-goose feathers	41
Hair felt	56
Still air	43
Scoured hair not felted	52
Water	335

(Siebel's "Compend of Mechanical Refrigeration.")

You will note from the above that wool fabric and dry absorbent cotton are the best non-conductors, with the exception of certain furs such as Arctic hare and baby caribou, neither of which have been scientifically measured. But cotton in any form will take up water in its cellular fibres, thereby increasing its conductivity nearly ten times (water, 335 B. T. U.); and it will do this without being actually wetted, as it takes up dampness from the woods air. Any man who takes shoddy blankets or cotton quilts into the woods with him will pay dearly for it with cold, chilly sleeping, and rheumatism the following winter.

Getting back to Peary: Eight years of living under Arctic conditions convinced him that wool must be discarded for fur, principally because any woven fabric will hold condensation, while fur will not. Even fur sleeping-bags were discarded because they

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would accumulate moisture from the body, and become heavy and conductive to heat. Bodily exercise during the day automatically dries its own perspiration if no violent exercise is undertaken just before retiring. Now, as any camper will tell you, the most vulnerable part of your body as regards cold is from your knees to your hips, a distance on the average man of about two feet. The feet and shanks are easily taken care of with wool socks and night slippers; and the upper part of your body lies close around the centre of combustion—your lungs; so no especial covering is needed there. Following these considerations, the night rig of the Peary party boiled down to a simple piece of fur, 2 feet wide by 4 feet long, which was wrapped around the hips, reaching down to the knees. From there on night socks of the fur of the Arctic hare presided over their pedal extremities, and for the upper part of the body the *kooletah*, or hooded fur shirt, was made so that one could withdraw his arms from its sleeves and fold them across one's main decks when sleeping, drawing also the pucker string at the bottom of the shirt and at the hood to make the rig air-tight. Thus equipped, Peary's people got rid of 40 pounds of damp fur sleeping-bags per man, and were able to turn in on a snow-bank at 54 below zero and sleep comfortably.

Now, while an Arctic party dressed in furs and

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nothing else except light wool undergarments can sleep in their day clothes, with ordinary outing-rig—corduroy, forestry cloth, or loden—one cannot so sleep with any warmth or comfort. There is sure to be condensed perspiration, to say nothing of external wetting from showers, wet underbrush, paddle drippings, and the like; and the surest way to be cold is to try to sleep with a coat on. However, I saw no reason why some of the day clothing could not be made to do duty at night, and that piece of 2 x 4 appealed to me as being exactly right to make a knapsack of. In fact, if made 2 feet wide by 5 feet long, it is still better, as you want at least a foot of flap left over after lacing up into a bag 2 feet square. The scheme promised emancipation from the blanket, greater warmth, and a more compact pack, besides reduction of weight, for I had not only eliminated the blanket but the tump-bag also.

To make such a bag I got 5 feet of heavy 16-ounce ship cotton duck, 22 inches wide, and put in a line of ⅜-inch grommets, spaced 3 inches apart, around the four sides. To line it I used, as a substitute for fur, wool quilting 26 inches wide by 5 feet long. I could not find any such quilting with narrow rib seams running across it so that it would fold easily without bunching, so it had to be made of batting, ribbed up on the house sewing-machine and finished off with tape edging. I first bought and tried the

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cotton quilting that is made up like this and sold for table covering, but after a week in the woods it grew damp and cold, and there was no living with it.

The first trial of this rig was entirely à la Peary. I used an extra pair of wool socks, which I put on at night, and over them bed slippers, also of fine wool. I laced the 26-inch by 60-inch pack about my hips, reaching from them down to meet the socks below my knees, and topped off with my hunting-jacket tucked around my shoulders and extending below my waist.

The rig was a great improvement over the single blanket, being entirely comfortable at such night temperatures as one encounters in May and October in the mountains of New Jersey, Pennsylvania, and southern New York.

The Camp Fire Club boys had a lot of fun over it, as they always do when any one ventures his person in the development of something new in the outdoor game. They dubbed it the "Belly-band pack," and predicted a prompt return-ticket to the madhouse if I ever took it to Canada.

I stood pat and returned the horse-laughs with sticks and stones. The pack-blanket weighed 2 pounds and held my tent, browse-bag, extra clothing, bulk provisions, camera, and miscellaneous small duffel-bag. The cook-kit went on top of it, a parcel 7-inch diameter by 14 inches long, in a brown galatea

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bag, which was the pillow bag by night. The cook-kit held all condensed provisions, dishes, pails, etc., and the entire pack with two weeks' provisions weighed 31½ pounds. I carried it 7 miles over hill and forest the first time I used it, and accommodated myself and a guest for a four-day tramping and fishing trip with it.

I do not believe this rig would be comfortable, as I first used it, much below 38 degrees, though I've never given it a trial at low temperatures. It seemed too vulnerable; the mitt principle was lacking. Your fingers in a mitt bag will be warm at unheard-of temperatures; separate them, each finger in the same thickness of wool, and they will freeze. In the same way a man's body in a sleeping-bag will be warm; while, dressed in clothing, no matter how thick, he will freeze. All of which the Camp Fire boys were not bashful about pointing out to the lunatic who was experimenting with "belly bands." All of which I granted, admitted, acquiesced in, allowed might be so, conformed to—and then I sprang a surprise on them overnight. If you turn the pack lengthwise and lace it to your browse-bag, you will immediately make of the combination a very respectable sleeping-bag. Well, why not? You had to have the browse-bag anyway. Why not use the pack-blanket in combination with it, instead of around you as a "belly band"? So I said nothing,

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but put the idea into practice. Profound approbation. I did not tell the erstwhile sceptics that the experiment was a partial failure, because the 26-inch quilting was not wide enough to lace up and yet leave sufficient overlap on each side to make the bag air-tight. I had to have more width to get enough overlap. So I added a piece of single army blanketing, 30 inches by 60 inches, weight 2 pounds. This was sewed to the pack just inside the lines of grommets, 1 inch from the edge. The quilting was left in as before. The 6-inch overlap on each side made the bag air-tight, and it was warm and comfortable during a two weeks' trip in December, with the temperatures ranging from plus 2 to plus 24, never as high as plus 32, or freezing. To make up into a pack, fold the overlap inward, flat and smooth, next lace up with the pack thong, making a bag 2 feet square with a foot length of flap left over. Fold up the tent into a parcel 20 inches long by 5 inches by 6 inches cross-section. This goes in the bottom of the pack, giving it its shape. The browse-bag is emptied of its leaves or needles and rolled up. It is 30 inches by 72 inches, with 8-ounce duck, bottom face, and unbleached muslin upper face. It has a row of grommets 3 inches apart along each side and the foot, and a short thong of No. 36 tarpon line for lacing. It rolls up into a package 20 inches long by 3 inches diameter and weighs 2 pounds, with a

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30-by-60-inch facing of army blanket sewed inside the bag. It goes into the pack on top of the tent, and there is room alongside it for a rubber floor-cloth, 2 feet by 4 feet 6 inches, a pair of socks, and camp mocs. The next things to go in are the ammunition bag and the "dry poke." These are canvas bags about 4 inches diameter by 10 inches high when filled and tied, and one of them holds assorted shot-gun and rifle shells, and the other the night socks, bed slippers, extra 'baccy, extra plain socks, film packs, and reserve matches. The top space of the pack takes a bag of bulk provisions, camera, and miscellaneous duffel-bag. This fills the pack, the flap of which is forthwith laced down with the end of the pack thong.

On top of the pack is strapped the cook-kit by means of a pair of 1-inch straps, starting from the upper D rings of the main pack-harness, passing over the kit and securing in buckles on the front of the pack. The kit consists of two aluminum pails, 7 inches by 6 inches, with covers which are held on by snap bales. The two pots go back to back in a tight-fitting brown galatea bag, with a pucker string, and at night this bag is filled with browse for a pillow. Inside one pot are four shallow tin eating dishes, fork and spoon, rice, corn-meal, sugar, baking-powder and dried vegetable bags, bouillon capsules, salt and match tins. In the second pot are a tea-pail and the

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PACK SACK SLEEPING-BAG LACED UP AS A PACK SACK.

THE ARMY MODEL PACK SACK SLEEPING-BAG.

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egg, coffee, and butter cans, with such soup-stock as macaroni, dried onions, erbswurst, dried meats, soup-powders, and the like filling the interstices. The main pack takes bulk provisions, usually pan-cake flour, plain flour, evaporated cream, pork, bacon, and codfish.

When you see the sun showing symptoms of setting, it is customary to put out a wary eye for a spring or a rivulet and a grove to camp in. Having found the spot, the first move is to lean the rifle against a tree and take off the ditty-bag and hang it over the rifle muzzle or from a neighboring twig. The next thing is to unbuckle the camp-axe from one's belt and cut three long, slender saplings from the nearest thicket. The cook-kit is then unstrapped and set aside, the pack opened, the tent pulled out, and in a few moments it is up. Next, an energetic clearing out of stubs, roots, rocks, and other offenders is in order, and then we go skirmishing for browse with the browse-bag.

Shades of Nessmuk and his beloved balsam! Balsam, pine, or any fresh green browse is too cold and too slow for me, a few inches of plebeian dead leaves or dry pine-needles are warmer and better.

"How about when the woods are soggy and wet?" asks the man from Missouri. In that case we do not fill the browse-bag at all. Just hunt up a hemlock or pitch-pine, give it a rap or two with the axe

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to clear off the rain-drops, and then pick a bed of browse, over which is spread the rubber ground-cloth, and on that the browse-bag.

To resume the operation of making camp for the night: returning from the browse foray, the 2 x 5 rubber ground-cloth is spread out along the north wall of the tent and on it is laid the browse-bag, open and toward the back of the tent. Next you lie on it for a few minutes, reaching in and straightening out any undue lumps of browse and arranging suitable hollows where your hips and shoulders come. Then the pack is unlaced and spread lengthwise on the browse-bag. The latter, being 30 inches wide, will curl in toward the edges of the pack as you lace up both edges and the bottom, and the total envelope around you will be 52 inches, not including 4 inches of blanket which overlap inside along both sides, making the bag effectually air-tight against drafts. To seal up the bottom, I usually drive in two stakes and lay my shotgun in its case across the foot of the bed, but a short billet of wood or an ammunition bag will do as well. It is, of course, laced across the bottom besides a flap of blanket for a seal, but some solid affair to brace one's feet against is apt to be well patronized after once trying it.

Having attended to these matters, the next task is supper. The pillow bag is stripped off the two pots and filled with browse; black-jack oak or

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yellow birch cut for the cook fire, and the dingle stick cut and set up. Presently the tea-pail is sizzling, and pot No. 1, with a couple of quarts of soup, is bubbling away merrily. Pot No. 2 will be doing rice, and one large biscuit is rising in two of the tins disguised as an oven, one being inverted over the other. The pots, by the way, hang from the stick by chain hooks which hook through the flat handles on the pot covers. These latter are held securely to the pot by their snap bales, but not so tight as to prevent the steam escaping.

Supper over and the utensils cleaned and scoured, comes the hour of bright camp-fire and chat with your bunky, and soon you get sleepy. You stay awake long enough to drive in a couple of stakes in front of the tent and stick the cruiser mocs on them, and then you set about turning in in earnest. Off come the day lumberman's socks, and the best place for them is flat in the pillow bag, where they will form a soft shield for your face against browse needles. Off come the black wool inner socks, and out of the "dry poke" you put on a pair of dry ones, a pair of dry lumberman's socks, and a pair of woollen night slippers. Thus rigged, your feet will never bother you even when ice is forming in the fresh-water pails, but do not skirmish around outside with your night socks on, or they will get damp, and every heat unit in your body will go down to

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your feet trying to evaporate them dry again, and you will soon be cold even with a mountain of blankets over you! If you expect the thermometer to go down below zero, a night rig of flannel pajamas is a good thing, if you have room for it in the pack. Otherwise leave your trousers on, if they are dry. Personally I found them warmer so than if spread out on top of the sleeping-bag, and they will not be damp and cold the next morning, as they surely will be if left outside of the bag. Finally, before pulling the blanketing over your shoulders, throw your mackinaw or coat clear over head and shoulders. It will settle down on you comfortably enough after you have made yourself snug under the blanket flap and helps keep your head warm. A Pontiac or camel's-hair hood or skull-cap makes a good, warm head protector for cold-night camping. Sleeping in one's felt hat is all well enough if you have accommodating ears, but the confounded thing *will* come off during the night if you turn over much.

Rigged out as above described, I have camped out comfortably, night after night, in temperatures ranging from zero to plus 20. With a good browse-bag your under-side is always warm; it is the upper-side that has to fight the cold. Now, a man with one thickness of blanket has no chance at all against zero temperatures or even freezing (32 degrees). If he doubles the blanket it is not wide enough to

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stay on him, as he has no lacing holding it to the browse-bag. If he takes two blankets there is 10 pounds of weight, and 2 cubic feet of baggage to load on a man's back, against 3 pounds (and a container instead of a package) for the pack-sack blanket. And at that, the blanket toter will not be really warm. There are yards of useless extra material around his feet, which he would give much to have transferred up to his hips and shoulders, where the cold is biting in! And his load! Well, it might answer on a canoe trip, where a portage of a few miles is the longest back-pack trip, or on a toboggan jaunt, where the snow carries the load—but not for a free and independent tramp over mountains and down brooks, such as the trout angler takes in spring or the hunter in the fall.

Now, I am not trying to proselyte in all this. I have no jobs for any disciples—no desire to found a Futurist school for outdoorsmen. There have been plenty of other minds working toward the elimination of the blanket. There is the "Arctic" sleeping-bag, made of pure llama wool and fine waterproof gabardine, good for 34 below zero, weighing only 3 pounds. It will go in a 22-inch-by-9-inch tump-bag, with room for a tent besides, and all your duffel and provisions go in the other bag, with the two side by side in a pack-harness. Aside from the expense of the Arctic bag—over twenty-five dollars

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—it is an excellent answer to "Eliminating the Blanket." Then, as another example, Doctor Loughren, of the Camp Fire Club, showed me an excellent scheme, a sort of quilt bag, made of fine, green, paraffined muslin, and lined with live-goose feathers. It is water-proof and light—4 pounds, if I remember correctly—and he rolls his tent and duffel up inside of it, and carries the whole thing with a tump-line; and there have been others—many of them.

Then there are the various sleeping-bags, consisting generally of a water-proof envelope, with from 2 to 16 thicknesses of blanketing, weights running from 9 to 16 pounds, or with a single eider-down quilt weighing 7 pounds. These are 7 feet long by 3 feet wide, with double 72-inch-by-84-inch gray blankets, and the manufacturers recommend 4 thicknesses of blanket for summer, 8 for spring and fall, and 12 to 16 for winter. Another type has one single bag of fine, soft wool worn next to the sleeper and a blanket of heavy felt-cloth, weight about 17 pounds. A variation of these consists in the various camp rolls and carryall beds, which are a combination of mattresses, blanketing, and 12-ounce duck envelope, arranged to fold over the sleeper.

The way to manage all of these is to save enough on the weight of the tent to make your total weight of shelter and sleeping accommodations come out

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as low as possible. A simple sheet of light waterproof material, set up either as a wedge-tent, a lean-to, or a Baker without sides, makes shelter enough, even though somewhat drafty, so that the total weight for freezing temperatures need not exceed 16 pounds. They are all rather bulky, in fact too bulky for a back-pack trip, and the weight is nearly twice as much as the writer would care to devote to that part of his outdoor equipment. The limit for a comfortable back-pack trip should be 35 pounds for a light-weight man, and say 42 to 45 pounds for a six-footer. And, of course, the prices of these manufactured goods are a very noteworthy item for any one but the sportsman who can readily afford guides enough to make a caravan out of his hunting trip.

This article merely aims to show what a poor man can do along the same lines, with every stitch of the equipment home-made.

The rig I have described has been out with me two years so far. I added to it a lining of brown galatea some time ago. It weighs only a few ounces and adds considerably to the warmth of the bag, because the sheeting serves the purpose of retaining the envelope of warm air that your body produces inside the bag. This continuously escapes through the interstices of a loose-woven material like blanketing and has to be replaced at the expense of your

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bodily energy. Several foreign-made gabardines also make excellent sheeting material. I took the pack-blanket bag out with me this February with the galatea lining and found that it added quite appreciably to its warmth. I should say that, as that bag now stands, it can be relied upon to be comfortable at all temperatures and humidities down to zero.

As might be expected, the original bag has been subjected to rigid scrutiny to save weight and gain simplicity. The photographs show two bags embodying improvements on the original model. One has a single piece of mackinaw blanketing, 54 inches by 30 inches, substituted for the wool quilt, army blanket, and sheeting. Experienced outfitters have claimed that the mackinaw is lighter and as warm as the entire other combination. I personally found it chilly at 36 degrees, and so added a facing of fine red flannel to make it warm enough down to 32 degrees. In place of the heavy 22-inch sail duck I substituted in this bag 10-ounce water-proof brown duck, which comes 28 inches wide. This 10-ounce brown water-proof canvas comes at forty cents a yard and has the great advantage that it can be hemmed, sewed, and blanketing sewed to it, all on the domestic sewing-machine, saving much tedious hand-sewing necessary with the heavy sail duck. With a 1½-inch hem on each side, it makes a pack

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PACK SACK SLEEPING-BAG DESIGNED BY THE AUTHOR.

The picture illustrates how the bag is fastened in use by bronze army snap-hooks

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25 inches wide instead of 22 inches, and it is not only better and more adaptable for larger men than I am but I find the extra three inches very acceptable in increasing the available capacity of your pack. The weight is 3½ pounds total, including canvas and mackinaw, or 4¼ with the flannel facing.

For below-zero temperatures I also made bag No. 3, 55 inches by 25 inches, of 10-ounce brown waterproof canvas, lined with caribou skin. This skin is exceedingly soft and fine, an inch thick, and very warm. The skins come about 6 feet long by 32 inches wide in the body part, and you piece out the neck with the excess fur around the head and ears to make it 20 inches wide where your feet come. It is sewed to the canvas backing inside the hem with strong black linen thread, and there is an overlap of some 5 inches of fur along each side for 3 feet distance, or from your shoulders nearly to your knees. The bag weighs 4½ pounds, is roomy and easy to pack inside, is very warm at 30 degrees, and and roasted me out at 42 degrees if I slept in my clothes.

The operation of lacing or unlacing the sleeping-bags takes six minutes. As far as the pack-bag is concerned it has been eliminated by putting United States army snap-hooks along the edges of the front face instead of the grommet holes. Either a rawhide

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thong or a braided rope is far preferable to ordinary twisted rope because of the latter's tendency to kink. The length of the thong should be 6 feet, one on each side secured to the middle grommet. I got rid of the necessity of thus lacing the pack-blanket to the browse-bag at night by riveting half of my army bronze snap-hooks to the latter in place of the grommets. Making up the sleeping-bag at night with this "hunch" is only a matter of a minute. It takes five if you lace it, and half an hour from the time you start unlacing the sleeping-bag until the whole pack is made up ready for the trail, with tent and duffel inside and cook-kit strapped in place. This includes striking and folding the tent.

For ladies' use and in permanent camps there have been two propositions advanced with the object of getting the pack sleeping-bag off the ground entirely. One of them is to put a row of five stout canvas loops along each side of the browse-bag, so that in wet weather it can be lifted clear of the ground by slipping two side poles through the loops like a stretcher bed. The second is to take along an Indian stick bed, which will easily fit in the space between the cook-kit and the top of the pack under the holding straps of the cook-kit.

I have tried out the former, but the rubber cloth on the ground and the sleeping-bag on it is good enough except for trips where browse is hard to

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get. For the ladies' equipment I have tried the stretcher-bed modification with signal success, as scratching browse night after night is a nuisance and can be avoided by making a thin quilt of the browse-bag lined with wool batting.

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CHAPTER IV

GETTING AWAY FROM THE BROWSE BED

THERE is an ancient partner of mine, an old side-kick who often goes to the wars with me, and he seldom overlooks an opportunity to remind me that I am constitutionally lazy, not to say averse to the vigorous use of the axe. (So I am, except for good and specific reasons.) He tells me that I would rather scratch browse around the woods like a chicken than cut me a good stretcher-bed pole frame with the axe like a man, and that that is the real reason why he so seldom finds me inhabiting a stretcher bed. I plead guilty. I have slept in almost every contrivance on the market, and in not a few home-made inventions, in a laudable effort to avoid scratching browse or, worse yet, knocking off the powdery snow from a few innocent balsams and denuding them forthwith of all their soft, feathery plumage in order to provide comfort for the family when the snow is knee-deep and the blizzard is roaring outside the tent. Except for the standard camp-cot, which is very flat and comfortable, most stretcher-bed devices are apt to become like canvas bathtubs in shape, and are altogether

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too prone to fold the sleeper up in himself until he resembles a human sardine to entice me into using them overmuch, and this is the real reason why I avoid them, not because of the labor of cutting a few paltry poles.

But the convenience of having a light, flat, springy bed, carried along with the rest of your equipment and always dry and ready for service when the day's toil is done, is a sufficient object to warrant spending a great deal of thought and experiment upon the obtaining of such a rig. For go-light trips and for extended wilderness trips, where so much food must be carried as to require paring down the tent and sleeping equipment weights to the minimum, the Indian stick bed and the air bed offer two practical solutions. I show in this chapter photographs illustrating what various experienced big-game hunters of the Camp Fire Club have done along these lines in these two types of beds. These men know how precious is that same bodily vigor which the inexperienced man so cheerfully wastes by sleeping on hard and uncomfortable beds. To have the reserve to call upon when your chance comes at maybe the only kill of the trip, and there is a flock of goats or mountain-sheep in sight but 3 miles away across a deep valley on another mountain than the one you have climbed, requires that you must be fit physically, not tired out and half alive from the exhaustion of night after

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night of unrefreshing sleep, where you turn and toss for hours before sleep overtakes you no matter how weary you may be. Wherefore note that many of these big-game hunters go provided with full-sized air mattresses, weighing about 10 pounds each and inflating to make a mattress some 5 inches thick, 6 feet 3 inches long, and 2 feet 1 inch wide. These mattresses add nothing to one's warmth; in fact, are colder than any form of browse mattress, but they are comfortable, very, and you can put them right down on the snow or on a muskeg bog, if need be, and they are always ready for use after ten minutes' blowing up; they stow easily, and, if you see to it that your sleeping-bag provides the necessary warmth, they make an excellent rig for wilderness canoe trips and pack-and-saddle mountain trips after big game. The one shown was used on a month's hunting trip in Alberta, with snow on the ground most of the time and temperatures ranging around 20 degrees at night.

While this air mattress and a sleeping-bag to go with it make too heavy a combination for go-light work and back-pack trips, a modification of it, originating, I think, with my good friend Otto Van Norden and since tried out by the writer, answers very well. This modification depends upon the fact that the lower part of your body requires no such support underneath as your hips and shoulders

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AIR-MATTRESS BED USED BY BIG-GAME HUNTERS IN ALBERTA.

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need. The part that must be air-carried reaches from just above one's shoulders to some 6 inches below the hip-bones and is 34 inches in length for a man 5 feet 8 inches in height and about 38 inches for a six-footer. Your neck needs no support at all and your head can be taken care of by almost any assortment of duffel and loose clothing, provided that you have a small feather pillow to top it off with. So this leaves as absolutely necessary only an air cushion some 18 inches wide by 36 inches long, as the pneumatic part of your rig, the lower end being thick quilting of a little browse put in to take care of your knees and feet. This at once reduces the weight and size of the mattress very materially, my own version of the scheme being two 15 x 15 pneumatic boat cushions sewed inside the browse bag, which laces to the Forester pack-sack sleeping-bag. These two cushions weigh 3¾ pounds and take hips and shoulders respectively, leaving some 30 inches of the lower part of the bag to be filled with loose browse. It is a warm combination because the upper face of the browse-bag is of brown flannel with about ¼ inch of Australian wool batting behind it. By cutting down the weight of the tent I have been able to accommodate the weight of these air cushions within the same total equipment weight for back-pack trips as before, viz., 20 pounds exclusive of grub.

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A third arrangement of the air bed is that used by Elt Warner, the human dynamo behind *Field and Stream*. It is shown in our illustrations and consists of a rubberized-cloth sleeping-bag, which is also a tent and has a half-length pneumatic mattress, about 24 x 36 inches, which makes comfortable the hips and shoulders. At first Warner was a little shy of this bag, because it was undoubtedly cold in spring and fall night temperatures without blankets. But by setting it up as shown, he found he could leave out a tent entirely from his equipment and add a light 3½-pound Hudson Bay blanket, and could then defy the world for combined comfort and warmth. The top face of this bag can be attached by snap-buttons up under the roof of the shelter cloth, giving it considerable slope, so that it sheds rain in almost any tempest. It lacked, however, an efficient mosquito-bar, and this was later added in the form of a bobbinet-bar draping down on three sides from the edges of the shelter cloth. With this rig should be taken along a light, small "tarp" to form not only a shelter for one's duffel but also a windbreak on one side of the shelter cloth. This equipment weighs 11 pounds and rolls into a package about 9 inches in diameter by 28 inches long. Packed in a brown canvas duffel-bag, with another alongside of it for duffel and grub, the two being carried in a light shoulder-strap harness, it makes an ex-

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cellent, comfortable go-light rig, always ready for service.

Another form of these shelter sleeping-bags on the market has a small pyramidal tent over the head end, this tent being an integral part of the bag and adding but a pound or so to its weight. It can be provided with a mosquito-blind inside, and, like all small tents, must have a ventilator in the peak somewhere or the tent will get breathy during a night's sleep.

The second proposal in getting away from browse is to adopt or modify the Indian stick bed. If you consider our woven-wire spring-bed you will have the principle of the stick bed, something flat and springy, upon which a mattress is to be laid, and on this your sleeping-bag or blankets. Out in Montana you can buy an Indian stick bed for eight dollars, with all its poles and trappings, highly decorated, made by the Blackfeet Indians. As they travel by pony and pack their goods on traverse poles, they have studied neither lightness nor compactness, for their beds are overwide and are truncate in shape, not rectangular. They are universally made of sticks of kinnikinnic, the sand-bar willow of the west, the sticks being some 3/8 inch in diameter and strung on cords just as close as they will go, I should say about 150 sticks for a 6-foot bed. To set up, just cut two short 6-foot poles of lodge-pole pine or white

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cedar and roll out the bed on them. Many a bivouac has been made on the prairie by scooping two hollows in the bunch-grass for hips and shoulders and rolling out the bed over these hollows. A deerskin or two forms the usual mattress. Mr. Ernest Thompson Seton, of the Camp Fire Club, has modified this bed for white man's use by making all the sticks uniformly 24 inches long, spacing them an inch apart, increasing the diameter to about ½ inch, and threading them through the strands of twisted hemp rope, tying fast with fine cord. He has retained the cloth binding of the edges of the bed universally used by the Indians, and, so fashioned, his bed rolls up into a package 8 inches in diameter by 24 inches long, and rolls out to make a 6-foot bed, weighing about 6 pounds. This bed, as stated above, requires a light mattress to make it comfortable and to take off the harshness of the sticks. A wool quilt or a thick deerskin or other fur will answer very well, and the combination makes a flat comfortable bed, fitting the contours of the body at all points and very pleasant to sleep on.

Realizing the necessity of this quilt or mattress, David T. Abercrombie, the outfitter, has devised a combination stick bed and mattress which has proved light and practical. The quilt is made of brown khaki, stuffed with wool batting, and has pockets on the under-side spaced 3 inches apart, in each of

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AN AIR-MATTRESS BED CAMP

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which is put a ⅜-inch natural willow rod. When rolled out this makes a warm, comfortable, springy bed, and if any of the sticks break it is an easy matter to replace them. The bed rolls into a parcel 27 inches long by 8 inches in diameter, and weighs 4½ pounds.

For my own use I wanted something more compact and light, also something that could go outside my pack and that rain could not hurt. In between the cook-kit and the top curve of my pack was a small triangle, behind those straps which go from the pack over the cook-kit, and this triangle of space I always felt was intended by Nature to form the abiding space for a stick bed. I wanted something that would roll up into a parcel not over 4 inches in diameter and weigh not over 3 pounds. There is just one point of your anatomy which *must* rest on something solid unless the whole rig is to be made unduly heavy and strong, and that point is your hip-bone. Given a support for that, all the rest could be made light. So I decided to make my stick bed springy enough to carry all my body except that bone, and let that touch "bottom," piling up a few leaves or some browse under the stick bed to take care of that hip-bone. With this off my chest, I felt safe in trying out light sticks for the bed material, and so chose the smallest obtainable, ¼-inch maple dowels. Another principle that I determined

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to make use of was the hammock effect of the longitudinal cords threading through the stick bed. With these made strong and non-stretchable, they would aid materially in supporting the total weight, just as in a hammock. So I bought a hank of strong "Banks" line, a green braided line of some 100 pounds' breaking strain, used for cod-fishing off the Newfoundland banks. This I cut into 14-foot lengths and used six of them for the longitudinal strings of the bed, as I figured that the knots would use up half my cord, and they did. I bought two stout ½-inch rods for the head and foot sticks of the bed, and fifty-four ¼-inch maple dowels, to be spaced 1 inch apart. It would not seem enough sticks for a man 5 feet 8 inches tall, but wait, there is a reason! This bed was made by drilling holes with a $\frac{3}{32}$-inch machine twist-drill through six points in all the sticks, and the cod-line was then threaded through with a knot on each side of each stick. An interminable job, ten to twelve minutes' work for each stick! The Indians, who have nothing *but* time, find it easy to make a stick bed, but I finally managed to squeeze out enough evenings of time to finish it. My wife, who likes to place a bet whenever she is convinced that her better half has jumped the trolley-wire, bet me a box of Huyler's that the bed would go all to smash the first time I used it, besides being too short. I took that bet.

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We then carried the bed out to a favorite camp site in the forest, and I cut two side poles, drove in four pegs at the ends *six* feet apart, and put on two cross-sticks for head and foot. Then I laced a thong around these end sticks and the foot and head sticks of the bed and drew the bed as taut as it could be drawn, making me a flat bed 2 feet wide by 6 feet long, including the lacing sticks.

On this a deerskin, and it was ready for trial. I sat down gingerly on one edge and rolled over on my hip. Bliss! Also *crack! crack!*—under the hip, two sticks! The wife let out a squeal of triumph and held out her hand for the box of candy. She won; but I didn't lose, for those two sticks were all that broke, and the rest of the bed was a marvel of comfort and lightness. It weighed 2¼ pounds, and rolled up a little over 3 inches in diameter. I slept on it for a week, and gradually one stick after another gave way, until twelve were broken, mostly those in which the grain crossed the axis of the stick. It in no way affected the general comfort of the bed, and I saw that I was on the right track and that the scheme was possible—with better material. For hard maple is too brittle; what is wanted is a tough yet springy wood like sour-gum or pin-oak; willow would be too flexible for such a small diameter of stick. The holes through the centre were also a mistake; nearly all the breaks occurred at these

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holes; the twisted hemp rope, with the sticks rove through a strand of the rope and secured with a bit of winding-twine, is the right fastening. Some form of wool quilt is, in my opinion, better than fur for the mattress also. My deerskin weighs 2 pounds 15 ounces, with fur on it an inch thick, the general dimensions being 4 feet long by 2 feet 6 inches wide. It rolls into a parcel 5 inches in diameter by 20 inches long, and the skin absorbs considerable moisture from the ground underneath, getting heavy thereby. I am at present making the upper face of my browse-bag a wool quilt an inch thick, for use with either the pneumatic cushions or the stick bed. This increases the weight of the bag from 3 pounds to over 4, and its bulk to about a 7-inch roll, but it lets out both the deerskin and the ground-cloth, the bottom of the bag being made of light, water-proof fabric in this form, and, as it gets away from picking browse, I am well satisfied.

To make up for this increase in weight, it was necessary to reduce the weight of tent carried. I still prefer the Forester for spring, summer, and fall camping as being the roomiest, warmest, and most cosey of the open forms of tent, but for snow work, when there is a blizzard blowing smoke and snow-flakes into the tent while one is trying to cook breakfast on an open fire in front of the tent, some one of the closed types is far preferable. I am not in the

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ROLLING UP THE STICK BED.

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least averse to experimenting in new fields with tents, and never yet was wedded to any of my own inventions; so in this case I set to work to devise a new "blizzard" tent, for one or two men, that would weigh 3 pounds. The illustration shows the result. It is, in effect, a modification of the well-known Hudson Bay tent, in that the ends are pyramidal instead of circular, so that only two more pegs are needed than with the ordinary wedge-tent, and no poles at all are required. This tent sets up 5 feet wide by 6 feet long on the straight faces, with the addition of the pyramidal triangles at each end, which make it 9 feet long from peg to peg. In the rear pyramid is room for duffel and a side-opening food-bag, hung up on two short stakes. The door is in the front pyramid, which is also the space sacred to a small tent-stove. This is something that I have always wanted for snow work, for if run right it will keep you warm and comfortable and cook breakfast or supper for you while the gale is roaring outside. This particular stove is simply a sheet-iron oblong with cylindrical ends which slips over the two aluminum pots of the Forester cook-kit, its size being 14 inches long by 7½ inches diameter by 7 inches high. The lids of the pots form the two covers of the stove, unless the pots are on duty in the stove-holes or there is a frying-pan holding down a hole on the top of the stove. Small draft-door in

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one side, and outtake for the stovepipe low down on the opposite side. Stovepipe is of two 20-inch lengths by 2½ inches diameter. Slope of tent pyramid carries tent well away from draft. Bottom of stove is open and is to be set on a flat rock and chinked with chips of stone to keep down bottom draft. I learned this trick from an open-bottom sheet-iron stove that we used in the West.

This "blizzard" tent weighs just 3 pounds, and packs into a parcel 3 inches diameter by 20 inches long. It is made of a light, oiled-silk fabric, given me by Abercrombie on one of our trips. Along one side goes the stick bed, with room for a bunky beside me, at the rear end the duffel and grub, and in the front end the stove. I have since added a bobbinet ventilator up in the rear peak, as I found the tent breathy after a night in it closed up, whereas the Forester is always sweet and full of forest ozone.

The blizzard tent is in no way to be compared to the Forester for general roominess and healthfulness, but in thick weather, either rain or snow, it does possess the advantage that one can cook in it, and with the addition of one of those small briquet burners, or the briquet itself burned in the tent-stove, same giving out quite a noticeable heat for ten hours after igniting, it would be comfortable at very low temperatures. These briquets weigh 7½

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BLIZZARD TENT WITH STICK BED ON LODGE POLE PINE SIDE POLES.

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pounds to the dozen, or enough to last a week of cold nights, at a weight of 4 pounds.

In conclusion, mention should be made of the stretcher bed and its direct modification, the net bed. The former is sold in tan canvas, 6 feet by 3 feet, with pockets along each side to receive the stretcher poles; weight 3 pounds. Stretched taut and provided with any kind of a quilt mattress, it is comfortable, and I have slept night after night for weeks at a time in the canvas sailor's hammock, virtually the same thing as a stretcher bed, without ever wearying of it. In both hammock and bed, if hung like a bag, it will be impossible to stretch out arms and legs comfortably. Sailors adjust their hammocks to lie flat and comfortable by taking up and letting out on the lengths of the lanyards running from the hammock-ring to the grommets in the edge of the canvas, and the same thing is done with the stretcher bed, by seeing to it that it is stretched taut and braced so as to stay so. Many a time I have made up the pack-sack sleeping-bag owned by the lady of the family so as to make a comfortable stretcher bed of it, as she prefers this to any form of browse mattress, probably because it raises her above an imaginary snake zone. The side poles should be amply strong so as not to spring in, and their ends are staked in place over two short cross-logs which form the foundation skids of the

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bed. Head and foot are secured by lashing the ends of the canvas to suitable cross-sticks on top of the side poles.

Few outdoorsmen have investigated the net bed, and only one has so far reported on it to me. The French make wonderful net-bags, which hold over a bushel of produce, yet when collapsed into a mere handful of twine take up no room at all. A net *bed* of the same type would take but little room and weight, and could be stretched on a frame, much as with a stretcher bed, and a mattress laid upon it. Something like camel's-hair or horsehair should be used to stuff this mattress, as the tendency of the net thongs to cut would have to be counteracted by quite a substantial stuffing. This objection would seem to put the net bed out of the running as compared with the stretcher bed of woven textiles, but still, when some of our original go-light cranks start experimenting with it, there is no telling what they will bring forth!

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CHAPTER V

THE CAMP-FIRE

THE open-hearth log fire is the heart of the country home. Poets, philosophers, artists—all have contributed to the world's sentiment over the sacred hearthstone. Entwined in the earliest memories of every country boy is the home fireplace, with its crackling logs, its fancy-inviting flames, its good cheer of pop-corn, black walnuts, and apple cider, the children's revels around the home hearthstone, the old people's comfort, the delight of the strong master of the house and his gracious life partner. Like the sound given out by the taut skin drum, there is an indefinable something about the sight of a log fire in the home fireplace that tugs at the very heart-strings of mankind. Yet if we analyze either drum or fire we find that their soul-stirring appeal dates back to the remotest birth of the human race. The skin drum that calls men to war and the wood-fire that always makes every spot in which it is kindled home have been with us for untold centuries; they call to the blood of the race, and every remote ancestral strain in our being re-

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sponds intuitively no matter how deep the veneer of civilization.

The forebear of the log fire on the hearth is the camp-fire. We have it with us yet, as always, but, while the hearth has been evolved so as to yield heat with almost any huddle of logs and kindlings, the camp-fire must be built rightly for the purpose intended, or it is worse than a nuisance.

Mankind on the trail cannot get along without external heat. The day's toil spends his energy, and his vitality grows low; the cold creeps over him and he has no strength left to drive it off with further output of toil. Cold food may yield sustenance and allow him to continue a little longer, but to really restore his vigor he needs external heat, hot food cooked over the camp-fire, warm heat-rays to penetrate his body and relax the tired muscles, drive out the cold and rheumatic aches, and put him in a state of comfort that enables mind and body to recuperate. And so we find, even in the Arctic wastes, where fuel must actually be carried along, that it is never gone without and its weight replaced by extra blanketing, but rather treasured and appreciated, for the finest part of the day, even in the snow igloo, is that hour when the day's march is done, the little spirit-lamp lighted, the frozen pemmican boiled, and the explorers, with their heavy outer furs removed, revel in the comfort

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and luxury of the heat from that tiny flame which soon warms the igloo far above the temperature outside and brings to an end the day-long struggle of bodily vigor against the bitter cold of the open wastes.

Even in the ordinary hunter's camp the energy spent on chopping wood for a good camp-fire at night is well worth while. One *can* get along without it, and through the long, still hours of the night a warm sleeping equipment that will defy any cold is the thing, but to miss the cheery warmth of a well-built camp-fire, substituting for it the glare of the carbide lamp and the warmth of one's mackinaws, is to lose the cream of camping out. What is really needed is the mental equipment of a knowledge of what kind of a fire to build with different forms of camps, so as to get the most comfort for the least expenditure of axemanship. For there are a whole series of camp-fires, each best adapted to its particular camp, and the veteran woodsman will build the right one for the right camp every time. There is the backlog fire, virtually a log hearth, suitable for cold nights in front of a group of open tents; the Indian fire, a circle of log ends with the fire in the centre, a great labor saver and easily replenished by simply shoving the log ends in as they burn away, suitable for the central fire of an encampment of closed tents;, the teepee fire, similar

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but of fewer and thicker logs, meant to give out heat with the least possible smoke, not a big fire but one built to burn long and continuously; the various cook fires, such as log ranges, reflector baker fires, lunch fires, and wire-grate fires; the tent-stoves for both cooking and heating; the snow fire, built so as to burn on a snow-bank and yet not put itself out through melting the snow beneath; the tent warmers and spirit-lamps for camping in country above timber-line; and finally the fires intended for something else than intense heat, such as the various smudges and jerky fires.

And a knowledge of these does not begin to exhaust the subject either, for back of them must be the knowledge of what woods to use and what to reject, how to kindle any fire and what materials are best for the purpose in various countries, and then how to manage your fire so as to get just the right amount of heat for the purpose, not too much nor yet too little. Every woodland cook should be a first-class fireman; even if you have not yet learned how to cook you can at least become an expert fireman, thus relieving the cook of much labor.

To begin with the backlog fire: Before you start in to cut anything there are a couple of points to consider, the first being what size axe you have to do it with, and the second the kinds of wood to select. If you are alone or with a bunky in a small

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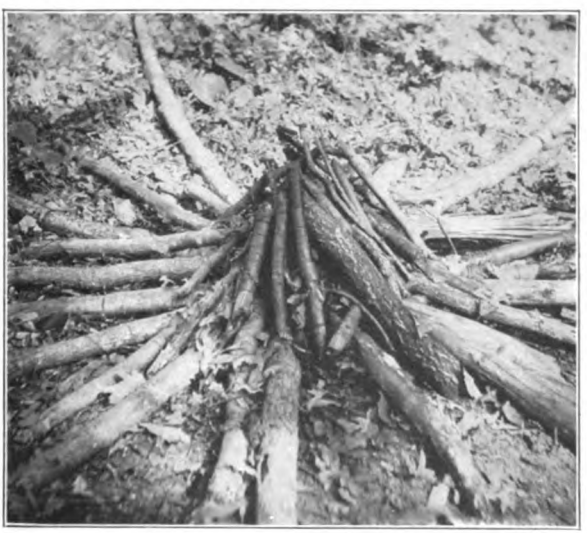
THE BACK-LOG FIRE.



THE INDIAN STICK FIRE.

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open tent and have a belt-axe you will not want logs over 4 or 5 inches in diameter, 3 feet long, and twenty of these can be cut to length and a backlog fire set up in about an hour's work. If a big fire, like the one in the illustration is wanted—something to warm up a large Baker tent with four or five men in it—the same job can be done with a sharp three-quarter axe, and the logs will run 6 and 8 inches, 4 feet long. Both fires will be built on the same plan: two stout stakes leaning slightly backward, then your heaviest log, and then four others on top of it; next two smallish logs of length a foot shorter than those for the backlogs are put down as andirons and staked in place; across the front of these a thin log for a forestick, and in the space between it and the backlogs a full pyramid of short 2 and 3 inch branches, well chinked with twigs, split stuff, dead leaves, and dry duff. This fire is touched off after twilight and at once becomes a pyramid of flame 6 feet high. As soon as the first charge burns down, three or four 3 and 4 inch logs are laid across the andirons together with more branches to keep up the blaze, and when these have burned to coals there should be a glowing bed of them large enough to keep all the succeeding logs going without trouble. Three charges of four logs each put on at 11 P. M., 2 A. M., and 4 A. M. will keep up a warm glow in the tent all night, and it is the answer to comfortable camping

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if the party is provided with nothing but blankets. The sound and refreshing sleep you get is worth the hour spent in wood-chopping, and is far better than shivering half the night and arising half fit for the succeeding day's work. For backlogs for this fire you will want non-inflammable woods—in the North country, green balsam or green black ash; in hardwood forests, red oak and red maple; in pine country, green pitch-pine and sour-gum. The same woods will be wanted for andirons and fore-stick. On the other hand, you need long-burning woods that give good coals and do not require very much small stuff to keep them going for the fire itself, so that a few heavy logs will keep burning without continuous replenishing, and here, for the North country you have the yellow and paper birch; in the hardwood forests, black birch, pignut hickory, hard maple, white ash, white oak, chestnut, and chestnut-oak; in the pine countries swamp white oak, post-oak, water-ash and black-jack. And while putting in your good energy with the axe, it is well not to waste it on "trash," *i. e.*, woods that burn up in a hurry, leaving you not even a respectable bed of coals to give out a glow of heat. Such woods are hemlock, sweet-gum, tulip, dry balsam, all the white pines, soft maple, the cedars, and the spruces. Many of them are not only short-lived but pop as if full of .22's, driving sparks about that will burn

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tents and bedding and perhaps set a leaf fire in the woods about the camp. A knowledge of how to identify the above trees, with or without the leaves, is the minimum of forestry that any one should take into the woods in his mental kit.

Our next illustration shows an Indian fire—the lazy man's fire. It can and has been built without ever seeing an axe, by the simple process of pushing down dead saplings and dragging them to camp, building over their ends a fire of dead pick-up wood, and after the punky sapling ends get dried out and started, pushing them in 2 feet at a time until all are consumed. It is a good fire to give light and a little heat in the centre of an encampment, where, after the evening meal, the party gathers to loaf and smoke and sing, and no one wants to work. The popular woods for it are dead beeches and white oaks, which may be pushed down, branchless for many feet up the trunk, under almost all high forest, particularly in moist ravines and wet hollows. Dead birches, balsams, hemlocks, and pines, with a little dressing from the belt-axe, serve the same purpose in the North, while in pine country, dead white cedars, black-jacks, and pitch-pines are to be had in untold millions from similar thickets of young growth. Fat-wood fires of dead, long-leaf pines are also used for the central camp-fire in the South, but the black, sooty smoke which they give out will soon

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make tents and duffel sorry and dirty in appearance.

The illustration opposite shows the well-known log range. I do not like it much because it does not expose enough of the pot bottom to the heat without making the pot too tippy and unstable, and practical woodsmen have no patience with the upset of a pail of good grub into the fire after half an hour's cooking. The side logs should be of non-inflammable logs about 8 inches in diameter, and must have small billets of wood under each end so as to get a proper draft under the logs. The fire is built in between and across the top of the logs, and by the time it has all died down to coals it is ready for culinary experiments—theoretically. In practice you have no control over the height of your pot above the fire, because it must go on top of the logs, so that in spots there is too much heat for the particular job and elsewhere there is too little. I personally prefer the cross-stick fire with chain or wire pot-hooks, or the dingle stick, where not more than three pails are on at the same time. With a wire grate, as shown in the picture opposite, much better control over the height can be had by driving down the grate pins with an axe, and the best fire for it is a cross grid of split hardwoods, such as maple, king-nut hickory, chestnut, and black-jack oaks, etc. None of these gives out much smoke, and, both while

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THE LOG COOKING-RANGE.

ON RIGHT, REFLECTOR BAKER FIRE; LEFT, WIRE GRATE AND GRID FIRE OF SPLIT BILLETS.

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flaming and as coals, they give a steady, intense heat that is fine for all boiling operations and, with a little trash wood added, good for frying. In the same illustration a correctly made fire for the reflector baker is shown. The logs for this may be of any wood, and the fire-wood should be "trash," for baking must be done hot from the start and finished in fifteen minutes if the biscuit or corn bread is to rise properly. What is wanted, then, is a hot, flaming fire, of short duration but high in flame, 2 to 3 feet. The slow-burning, non-flaming woods are just what one does *not* want in this work, for they will invariably burn the under-side of the baking before the upper has even begun to brown. A couple of blazing sticks laid on top of the wire grate will give you the same desirable high flame.

For starting any of these fires, Nature has provided a suitable tinder for every forest in which the woodsman may find himself, for the bark peelings of all the birches are good tinder, and some species of the family grows almost everywhere; white cedar is universal, and its bark when crumpled and worked by hand into a wad of bark fibre will take the smallest spark. In practice one seldom hunts up either of these trees, for the dead twigs which can be broken from the tree, underneath the living boughs of all spruces, balsams, hemlocks, and many hardwoods, are right to hand and nearly always dry. Even

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when thoroughly wet, all one needs is a stick of soft wood and a hunting-knife to cut all the dry shavings needed after once getting through the wet surface of the wood. If you have only one match and no cedar or birch seems to be handy to the blazed trail on which you have halted, and you want to be absolutely sure of that fire, cut at least a hatful of shavings before you light the match; even a handful of them may go out unexpectedly before the larger wood "takes" in wet weather, but a hatful, never. And, before the precious match is struck, be sure that the whole gradation of a fire—shavings, splinters, twigs, sticks, branches, and small logs is at hand.

As soon as one moves the camp-fire inside of the tent, a new variety of conditions arises. All the products of combustion must be gotten out of the tent, and this applies to smokeless tent-warmers as well as fires, for a good deal of carbon monoxide is produced in all stoves, as well as the carbon dioxide which follows complete combustion. Both gases are poisonous, the former virulently so, and many a fatal termination to a night's sleep in a closed tent has been narrowly escaped by parties of explorers and hunters who trusted to one of these tent heaters without seeing to it that the tent had proper ventilation. Yet in a closed-tent camp a fire of some sort is a luxury that it is hard to make the uninitiated

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conceive as possible. Not only is the earth dampness and chill driven away, but the necessity of cooking a meal out-of-doors in perhaps inclement weather, often in pitch darkness, is removed, and one is cosey and at home for the night after the day's work is done—done with the stern and inhospitable wilderness for the time and at peace for once with the whole visible world. Many men, because of having to do writing, or scientific work, or having some other occupation aside from hunting and travelling, require a closed tent for the evening's work, and in wintry weather such a tent will give one more comfort with less labor than any open tent made. Wherefore the problem of how to bring the camp-fire inside the tent has been given much study by those who know. The most primitive of tent stoves is the red man's. He has had that problem before him for centuries, and has, as usual, solved it in the only logical way without sheet metal to help him. With pottery and stone-work at hand to construct a stove, he does nothing of the kind, but contents himself with bringing his outdoor fire inside, feeding it in the same way—but with a difference! For, to feed in the logs toward a central point, while it answers very well in the daytime, argues that some one will have to stay awake to do the feeding if the same scheme is to be followed at night. But any one who has handled a log fire in

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the home fireplace knows that a well-charred, bone-dry log will burn steadily all night—with a glow, not a flame, giving off considerable heat, yet no smoke—if it has a small bed of embers under it. The same charcoalizing process takes place as in a well-managed tent-stove with this log in the open, if it rests on its own embers, partly smothered in fire ashes, so as to reduce the draft to a minimum. Two of these logs, or rather billets, is the Indian's answer for a small all-night fire in the teepee, the last and biggest of his log ends being huddled over the remaining embers and allowed to glow for the rest of the night, the best wood for this purpose being white oak. While a white man usually fills the teepee with more smoke than heat, and ends by having a fire that is out to the last ember two hours after the party has turned in, there is no reason why his being a white man should make this inevitable; two big logs that have had the fire between them all evening, if set together over the coals on turning in, will char and burn slowly all night, giving off plenty heat enough to keep the chill out of the teepee. For the white man's tent, however, the sheet-iron tent-stove is best, for it means coffee, biscuits, bacon, fish, and cereal for breakfast in the morning, and that, too, without ever going outside; and it means mulligan, rice, steak, tea, stewed fruit and hot corn bread at night, when the day's hunt is done and it is dark and snowing a blizzard outside

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and every one is dog-tired. All this is worth while, whether the tent will hold one or six, and your veteran will take some sort of a collapsible tent-stove along, fitting outside his cook-kit or else folded flat in his knapsack if he is doing winter work. The big outfitters have provided various sizes and models, many of them worked up from the experience of the Rocky Mountain and Klondike men, and almost every large cook-kit has some sort of stove that fits over its biggest pail, adding little to the weight and almost nothing to the bulk. Over the nesting aluminum outfits goes a plain cylinder stove about 12 inches diameter by 12 high, one hole, with telescopic pipe fitting on a collar in the top of the stove. But a one-hole stove is a hard thing to get even the simplest meal on, and an oven saves many times its weight, in that it allows flour and corn-meal to be baked into hot, fresh breadstuffs, food weighing much more than the original flour, so that we find on the market, and worthy of investigation, several sizes of folding sheet-iron stoves and ovens, besides a number of light box stoves with the oven in place, same being used to carry cook-kit or grub-box inside. One type is a log stove in the shape of a half cylinder, with two stove-holes in the lid and a collar for the smoke-pipe, an oven which forms part of the stovepipe, and can be stowed inside the stove when carrying; and, as this oven is raised 6 inches

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above the top of the stove, the whole surface of the stove is available for cooking.

For the amateur camper and experimenter, both stove and oven make fascinating problems. Any pail not soldered can be turned into an oven, either by setting the baking-tin inside of it, held above the bottom by another tin inverted, or the pail can be laid on its side and a square tray with biscuits or batter on it set in sideways, whereupon the curve of the walls of the pail will hold the tray clear of contact except where its edges rest on the pail walls. This, set in a bed of coals and ashes and covered with live coals, makes a good oven. For my own cook-kit I got up a round-ended stove of 27-gauge sheet iron, as shown in the picture, which just holds the two aluminum pots side by side with a sheet-iron bridge in between. It gives me a two-hole stove, with the smoke-pipe attachable to one rounded end and the stove-door in the other. The pots either rest on the coals inside or are held above them by long through-bolts, on which they rest.

Most fires, logs or sticks, go out and the stove is cold two hours after the party is asleep; but if care is taken to prepare a billet or two of hardwood that will just about fit inside over the coals, that billet will smoulder and give out heat all night long with a pinhole draft in the stove-door, and most of these doors are provided with such a hole for

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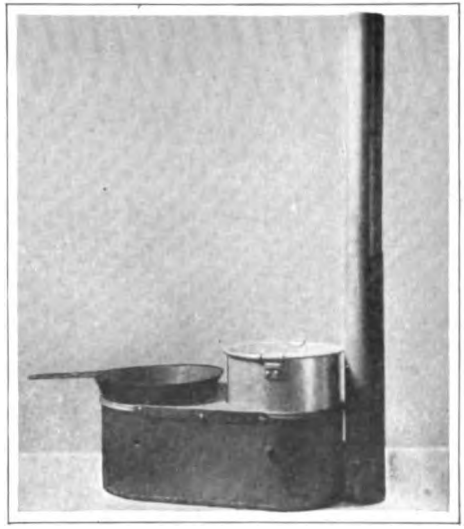
ONE-HOLE CAMP STOVE. ROOM FOR ONE EXTRA POT ON TOP.



TWO-HOLE CAMP STOVE DESIGNED BY AUTHOR FOR FORESTER COOK KIT.

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that very purpose. They are all hard to start if one puts in more fuel at first than the draft can properly take care of; the thing to do is to get enough small wood burned down to coals to form a bed of them, after which large sizes of split wood can be fed in and the stove will use them up by the charcoal-making route.

For work above timber-line, the camp-fire takes the form of a spirit or kerosene lamp. Denatured alcohol, or just plain kerosene, costing a tenth as much; both have one-hole and two-hole blue-flame burners available in light, folding explorer's stoves. The kerosene-burners work on the principle of the familiar gasolene plumber's torch, a little raw kerosene first being ignited to heat the burner, after which the affair is self-vaporizing, and the height of the flame is then controllable with a needle-valve. With these burners is supplied a sheet-iron radiating drum for tent-warming, after the cooking is done, and this drum serves as a packing-case for the lamp and its special kerosene-can when on the trail. With denatured alcohol the process is even simpler, the burner simply being lighted, when the hot blue flame of alcohol vapor is at once available, and, of course, it gives many more heat-units per pound of fuel than kerosene.

A rig similar to these which a friend of mine uses on his one-man hikes is nothing in the world but

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a short, extra-fat candle with a big wick, the only other apparatus besides the candle being a sheet-iron collar or spider, on which the bowl or frying-pan rests, held by it a short distance above the flame. A similar apparatus using solidified alcohol is on the market and gives much more heat for the weight carried.

Finally, there are the briquet tent-warmers, the briquet simply requiring to be ignited, when it will smoulder all night. Of course, it will asphyxiate you unless there is a ventilator up in the tent peak; but the heat it gives out means the difference between absolute chill, with your breath forming a sheet of ice on the inside of the tent near your face, and a reasonable atmosphere of warmth, warm enough to breathe freely, and considerably above the temperature outside. Most of these briquets have some sort of frame stove or warmer in which they go while burning, and some experimenting would adapt this holder more to the requirements of portability and compactness required by trail conditions, as the present models listed are identical with those sold for household purposes.

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CHAPTER VI

COOK-KITS AND COOK-FIRES

MOST people seem to think they are missing something in their camping unless everybody squats down to burn a piece of meat on a forked stick over a camp-fire. I'll admit that there are all kinds of ways of preparing for your stomach the crop that is garnered with rifle and rod. I have been —and am yet—as primitive in my ways as any of them; but, having cooked many a square meal with all kinds of culinary equipment, from no utensils at all up to a complete aluminum outfit for eight people, I should like to set down here a few rambling notes and experiences under the subcaption, "Cooking-Kits I Have Met."

To begin with the one where there are no cooking utensils at all: Were you ever out for two days with nothing else but rifle, axe, and ditty-bag? Here we get an immediate return-ticket to the ways of the "ignorant and barbarous" savage. (I often wish that the professor who coined that phrase would try, just once, to make a flint arrow-head!) You, in all your enlightenment, plus a good rifle, are now to match your wits against the "primitive" red

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man's in the great game of keeping alive and comfortable. Your blanket will be a leaf pile, your tent a brush lean-to, your cuisine a forked stick and a bark tranchoir. Your ditty-bag furnishes you salt, tea, sugar, and pea meal—nothing else—and your rifle has provided a grouse or the rod a fish.

To broil the grouse on a sassafras fork is simple enough, even for an enlightened white man, and to plank the fish is also not out of his mental reach; but if we are to enjoy tea and soup a container of boiling water must be produced. Your folding drinking-cup does not arouse any enthusiasm as a pot to boil water in; better save it for the tea. How are we to procure a container holding at least a quart of water? How did the early Indian? Well, he made them out of bark, skins, tight-woven basketry, pottery, cedar boxes with wooden tree-nails, and, finally, dugouts. We want that tea and that pea-meal soup, but it is nearly dark and there is no time to search the woods for a birch or an elm for bark. This leaves the dugout as the sole remaining practicability. First, get some good hard stones from the brook for boiling your water. This done, rake out a bed of embers, pile a layer of stones on them, and pile a layer of embers atop with a grating of black-jack oak sticks, split lengthwise, to encourage the embers to continue. All this predicates a pair of tongs, which are easy enough

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to make out of the nearest young hickory or red oak shoot. Flatten and cross-hatch in the middle with your hatchet, flatten a grip on the ends, supple over the fire and bend double, securing with a bit of twine. You will need it to handle both embers and stones.

Now for the dugout. Fell a young maple or black birch 6 inches across and cut off a clear length about 2 feet long. Flatten one side and make a set of deep cuts along the flat face—"chamfering" it is called—ending with a cut in the opposite direction. Split off the chips with a series of lengthwise cuts and you will perceive a long, shallow hollow taking form. Cut and split, deepening and widening the hollow and finish out with knife and hot coals. A hollow 1¾ inches deep by 3½ inches wide by 14 inches long will hold one quart of water. Cut a pouring lip in one end and fill with water and you are ready for the stones, which should be ready for you. Dip them in at one end of the boat. It takes six hot stones the size of an egg to bring a quart of water to a boil. Put a pinch of tea in the drinking-cup and pour on boiling water. It will be ready in four minutes. To make the soup, two teaspoonfuls of erbswurst will make all you can eat. As I am probably one of the few white men who have boiled water, made tea, and again boiled it for fifteen minutes and made a palatable soup in a log bowl

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with hot stones, a few hints on the "technic" of it are given here. The bowl, as above described, took just an hour less five minutes to make, complete. It held an even quart of water. At the fifth stone it was boiling, and I steeped two cups of tea in a folding aluminum drinking-cup. After that two teaspoonfuls of erbswurst powder were added and the stones applied one after the other, keeping the bowl boiling for fifteen minutes. Pictures in museum groups usually show the Indians handling dirty black stones with stick tongs, but if you manage your fire right and leave the stones on the fire till they are really hot, they will be clean as ice, and though your boiling water will not be exactly clean, it will not be dirty, as is the soup of a digger Indian. It takes ten stones the size of an egg, heated in the fire, to keep a bowl of quart size continuously boiling, and about one-half of it will be boiled away, leaving a pint of very palatable soup, albeit slightly dirty in spite of your best care. The wood I used is red maple, which gives absolutely no woody taste of any kind to the soup.

For meat, if you have no grouse and no fish, half a dozen small birds will answer. I have done a dozen small beach-snipe very nicely by broiling on a wire out of the ditty-bag stretched across a large maple fork—and they fed two men full.

If you happen to have a small bag of self-raising

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flour, biscuits are not beyond your reach. Get a club about 4 feet long, peel about a foot of one end and drive it in slantwise over the fire, where it will get roasting hot. Make up a stiff dough with your flour and mould it into a long strip. When the club is almost burning hot, wrap the strip around it and replace the club over the fire, turning it now and then as the strip of biscuit cooks. When done, face the club your way and go to it!

Man can get along a day or so in primitive savagery and have considerable fun out of it, instead of the hardships usually dilated upon by the outdoor-fiction artist, but an emergency ration in a small shallow tin container makes his work much easier. I have carried for years in the ditty-bag a small tin about 4 inches in diameter by ⅝ inch deep (originally the top of some can). Generally it holds trout leaders, but, made up as an emergency ration, it holds a couple of slices of bacon, a paper of tea, two bouillon capsules flattened, a little smoked beef, and a pilot biscuit. There is a nail-hole in each side and a bit of string passes through the holes and keeps in the hardtack, under which is the rest of the ration. With a nail driven through the hole into a bit of hard wood you have a very passable frying-pan and can do a fish in chunks nicely, after which it is ready to boil you a dish of bouillon and cup of tea. Emergency salt I always have in the ditty-bag in a hard-

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rubber screw-top container. There are four meals in this little ration, even with no help from fish or game, and while one can always find fish, frog, or bird, there are occasions when a quick, nourishing lunch and a push on back to camp are better than time spent in rustling game and an enforced night in the open.

Another good emergency ration can be made from the tin of a well-known brand of tobacco—Arcadia. This is pressed seamless, with rounded corners, so that it will slip into any pocket. It has no solder anywhere to melt. It holds a whole cupful of water, is 3½ x 3¼ x 1½ inches deep and you can stow in it tea, coffee, sugar, pork, bouillon, corn-meal, rice, powdered soup-stock, erbswurst—in all two full days' rations of condensed foods. With a nail-hole in the side, it is ready to act as frying-pan, tea-pail, soup-kettle, and oven, or you can suspend it over the fire with a pothook by means of a wire passing through holes in cover and side as shown.

The next step up the culinary ladder from the emergency ration consists in the various compact one-man and two-man cook-kits. I will venture on a description of two of them. The first is a well-known outfit, purchasable at any sporting-goods store. It weighs 2½ pounds and goes in your pack or your pocket as a package 9 inches long by 4 inches wide by 2 inches thick. Dissecting it, we get, first,

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two cups 2 x 4 x 3¼ inches deep, capacity of nearly two ordinary cups; next a pail 2 x 4 x 8 inches deep, holding 1½ quarts of water; then two long frying-pans of pressed steel 9 x 4 x 1 inch deep, one with an enlarged lip to close over the other to make a Dutch oven; finally a folding wire grate 8 by 7 inches with four 7½-inch wire legs and an upstander to hang the pail in. All these pails, cups, and pans have detachable wire handles which go inside of the package, and there is still room for knives, forks, spoons, and a lot of condensed provisions. The meal for two or even six that can be cooked on this rig is really astonishing. The pail stands in the upstander of the grate to prevent any untoward upsets and can be making a soup while tea is brewing in one of the cups (double strength, so that it makes all two people can drink), the frying-pan is just right for fish, while the other pan is turning out flapjacks. Most beginners with this kit do not know how to manage the fire. The grate legs are too short for the usual grid fire of such larger grates as the regular camp-grate, which should not go less than 10 inches above the ground. With the little grate, build your fire of hardwood until you get a substantial pile of live coals, meanwhile boiling water in the pail, then stick the grate down over the coals and replenish underneath with oak, maple, and hickory sticks as needed, a very few at a

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time, for the classic beginner's mistake is too much fire.

Another excellent two-man cook-kit, soon to be put on the market, is the one designed by Mr. Phelps, a modest member of the great outdoor brotherhood, whose original ideas in the art of going light are well worth publishing. Mr. Phelps's kit is shown in detail in the photographs herewith. The whole outfit goes inside a 6 x 7½-inch canvas water-pail which folds over with a strap to make a package 6 inches in diameter by 5 inches high. The kit weighs 1½ pounds and consists of two seamless tin bowls 6 inches in diameter by 2½ inches deep, holding a quart each, a 6-inch steel frying-pan, two 6-inch flat plates, a 3 x 2 inch cup, knife, fork, spoon, swab, two chain pothooks and the detachable bales for bowls and pan. These latter deserve especial mention. Any one who has tried cooking in shallow pans and bowls with wire bales knows how exasperatingly tippy they are apt to be. Phelps circumnavigated this difficulty by making one side of his wire bales double-wired and providing two holes in one side of the bowls. The bale then snaps into two holes at one side and one in the other and is thus rigid and will not permit the bowl to spill its contents. With this rig you can boil rice, make a quart of tea, and fry a fish all at the same time, or one of the bowls can be covered with one of the flat

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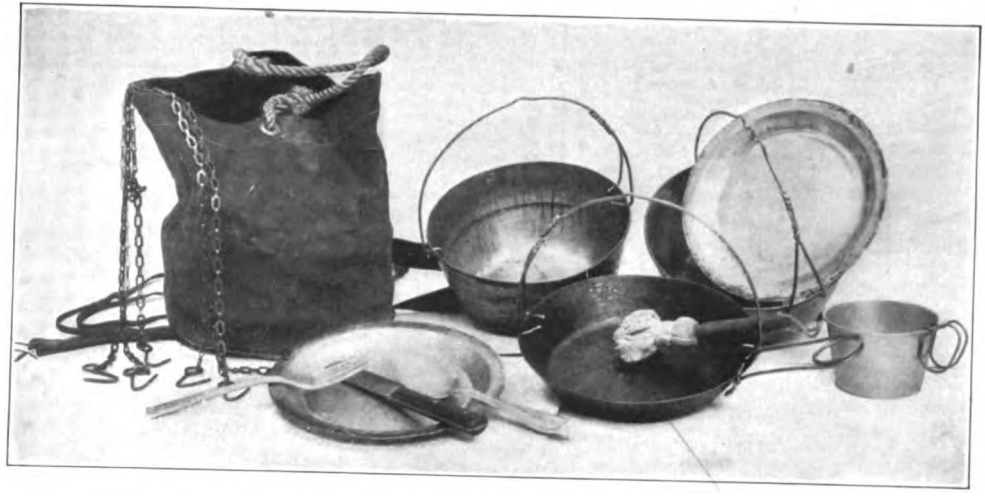

THE PHELPS COOK KIT.

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tin plates (which just fit) and used as a Dutch oven. The chain pothooks are made of ordinary window-sash chain with a brass curtain-hook at each end, and not only are exceedingly stowable but allow adjustment of the pail at any desired height by hooking the upper hook into any link of the chain that will give the right height.

I presume that my own cook-kit comes next in this ascending scale of culinary grandeur. I never feel comfortable as acting chef without three pails about me. Less than that you can worry along with, but with three you can have rice, soup, and tea all going at once, or one can "be" a biscuit oven, while another does coffee, and the third puts the breath of life into some dried apricots or has pork cubes bubbling in it. No matter where you wander along culinary trails, those three pots follow you like so many kittens, and there's always a job for each.

The principal trouble with provisions in a pack-sack is that they may get wet, and they are not particularly available, especially the small parcels. If you put them all in one water-proof bag inside the pack, said bag is likely to be lumpy and knobby and not in the least accommodating to artistic stowing. My cogitations on these matters led me to the principle that all small provisions are better stowed *in* the cook-kit, where they cannot get wet or lost, than anywhere else, leaving but a few large

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bags of bulk provisions to go in the top of the pack. Further, if the cook-kit is of the right shape to stow on top of the pack-sack it will be handiest there, as easier to get at for noon lunches, first out of the way when making camp at night, and last to be packed on hitting the trail again next morning. I wanted something of small diameter and lengthy enough to strap nicely on top of the pack, and so began experiments with two tin pails which ate each other like a collapsible stovepipe and inside of which were all small provisions and utensils. These gave way to two aluminum pots holding a gallon each, 7 inches diameter by 6½ inches high. The covers were held on with snap-hooks and the handle of the cover took a twig pothook or a chain one with equal facility. Nesting inside of one pot is a tin tea and coffee pail, inside of which are stowed bags of sugar, corn-meal, rice, salt, and macaroni, a pound tin box of bacon, a pound tin box of codfish, dried onions, beef capsules, soup-powder, and tea. In the other pot go two nesting 7 x 2½-inch mixing-pans, three 6 x 1-inch tin pans, three 6-inch tin plates, a can of 14 fresh eggs, cans of matches, coffee, baking-powder, and butter. Empty, the kit weighs 4½ pounds; loaded, 12 pounds. The two pots go back to back in a brown canvas pillow bag, or, as Mr. Phelps's pail idea is excellent, I will doubtless put them in a waterproof canvas pail bag, 13 by 7 inches, hereafter, and

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the package is strapped on the pack by an extra pair of straps for the purpose. Inside the pack I carry a 10-inch aluminum plate, a blue enamel cup, and a 6-inch steel frying-pan *with* the handle, as this latter useful adornment is not in the way at all and saves the bothersome attachable-handle nuisance. My bulk provisions are white flour, pancake flour, pork, dried apricots and prunes, and a few fresh white onions, in all 7 pounds; or 15 pounds of provisions in all, making about 50 pounds of food when cooked, enough for one man for two weeks or two men a week without either fish or game. As you can surely count on one or both amounting to one-third of the total food supply, the cruising radius of this rig is about three weeks for one man.

This kit will cook for six but is at its best for two or three men, who will usually consume a gallon of almost anything they set their tongues to in a single meal. All of the kit can be bought in a department store, as there is not a patentable or patented article in it.

As I have no room for a wire grate, I have come to prefer the dingle-stick fire (shown in the illustration) for lunch, and crotch-and-cross-pole rig for supper and breakfast. The dingle stick is a stout 10-foot sapling with one end shoved in the ground and a support of two forks rigged as a shears holding it out over the fire. From it hang by chain pothooks the two aluminum pots and the tea-pail. Usually

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for lunch I have chocolate, a couple of scrambled eggs out of the egg-can, and some warmed-up fish or game, and corn bread or hasty pudding. For this meal, then, you need but the tea-pail, one pot, and the frying-pan. For supper, both pots, the pail, and the frying-pan will usually be at work, with the tin pans for mixing, etc. While two forked sticks and a cross-pole are the classic camp-range, the forks are not easy to get, and a quicker rig is to drive two 3-foot stakes into the ground and lash the cross-pole to them with a couple of bits of copper wire out of the ditty-bag. Building a fire of hardwood, you soon have the tea-pail and the two pots simmering over the fire on chain hooks, the latter hanging by their covers, which are held on by stout snap-hooks on each side.

Before leaving the small kits the mention of some sort of a hot-lunch rig is in order. I believe that half of the headaches and upset stomachs that anglers seem to be heir to is due to the cold lunch which the landlord sticks in your creel or fish-basket at the last minute, and which usually turns out to be made of lead sandwiches, concrete pie, and a couple of petrified eggs. Your stomach looks in vain for the good old hot coffee which serves more to warm up the rest of the edibles and get your gastric juices in action than anything else. I show herewith a species of pail, bent to fit the body, with

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a wire hook to hang it over the fire and a cover which serves as a cup. Department stores keep it in tin for the munificent sum of 25 cents, or the outfitters will sell you what is known as the Japanese army cook-kit in aluminum for $1.75. This is also kidney-shaped, size 3¾ x 6½ x 5½ inches, weight 16 ounces, fastened up with strap and buckle. All these are stamped in one piece, with no joints, whereas the tin one is soldered and you will have to watch the fire. The Japanese kit has an inset tray which would do as a frying-pan, giving you two cooking-utensils and a cup cover. The department-store affair is big enough to take two shallow tin dishes, useful for either frying or as an eating dish. If I were taking an outdoor lunch with this kit I would have a little bag of tea, ditto of sugar, some salt, a packet of bacon, and a packet of erbswurst or a packet of some one of the condensed soups, such as bean or mushroom. When lunch time comes you can then supplement the sandwich with a good hot cup of tea and in ten to fifteen minutes' cooking have a couple of platefuls of palatable, nourishing soup, and your bacon will serve to fry a fish. After that you can fish or tramp till the sun sets and the moon comes up and yet not get that empty feeling. There is plenty of room in this container for all your fishing-tackle, compass, and other small duffel, so that it acts as a sort of a tin ditty-bag, so to speak.

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When there are six or eight in the party, all these go-light cooking-kits had best give way to the standard aluminum nesting sets manufactured for the purpose. You want at least four pails and they must hold several gallons each; you must have mixing-pans and at least two large frying-pans with detachable handles. A stout wire grate, with its own legs, replaces the cross-pole cook-range and a folding baker makes biscuits, a dozen at a time, or corn bread in cakes large enough for eight hungry campers. There is no getting away from this outfit with any comfort, and a party of that size can easily pack the whole kit between them. The pictures in this chapter tell the story concisely. In these illustrations, by the way, I have shown the fire-wood placed but not lighted, as it is almost impossible to get sharp pictures when there is any camp-fire smoke about. The illustrations show an aluminum nesting outfit in action, a folding baker and the way to use it, a camp kitchen rigged for handy management of the provisions, and an eating fly with table improvised from logs and stakes under it. Examining first the utensils, you will note three pails and two frying-pans (on the wire grate). The larger pails are 12 x 12 inches and 10 x 8 inches, respectively, and hold 4 and 2 gallons. The largest is for general boiling-water supply and the second is doing soup. The third pail is boiling rice and the

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COMPLETE ALUMINUM COOKING OUTFIT FOR A PARTY OF EIGHT.

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frying-pan has presumably a dozen quail in it. Note the arrangements in cut form of the split hardwood and the wire grate. We find that a crib of crossed split black-jack gives the most heat for the longest time and leaves the best bed of coals. Standing alongside the fire is a gallon pail of tea, set there to be handy for boiling water on the tea grounds just before supper is served. The other pail has prunes in it, just simmering over a bed of live coals raked out from under the grate. Five pails and a frying-pan are at work for we have a party of eight to feed.

But there is still more to the story of this supper. Note the biscuit-baker and its fire, also the dough-mixing-pan, the bread-board for rolling out the dough, and the second pan with a cover on it from the largest pail to keep the first batch of biscuits hot while the second is doing. About sixteen biscuits to the batch is the best that we can do and I never saw a party of eight yet who couldn't stow thirty-two biscuits between them. There is no better rig for baking fresh biscuits or corn bread or roasting meats than the folding reflector baker, yet through badly made and managed fires inexperienced campers usually succeed in burning the bottoms of their biscuits black before the tops have begun to brown. While certain woods such as long-leaf yellow pine will give tall, hot flames, high enough to roast both ends of a biscuit, the reverse is true of most of the

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hardwoods. Wherefore the best fire for the baker is made by driving in two pairs of stakes absolutely upright and about 18 inches high, each pair being 3 inches apart. Between them are slipped short 3-inch logs 2 feet long, one above the other, making a little wall of logs 18 inches high. Flat against this is built the fire of vertical sticks of hardwood well chinked with dry chips and twigs. When the biscuits are in the pan and ready to be done, touch off your fire and you will have a roaring flame 30 inches high at once. The biscuits ought to rise and brown in ten minutes. Have an extra green log handy and if you see that your under biscuit faces are getting burned before the tops are done, lay the log across the lower face of the baker where it will effectually stop at least half of the heat-rays. And never let the baker become sooty or rusty. The biscuit-pans can be as black as you please, but if your reflector baker is going to reflect heat it must be kept bright and shiny. The bakers come in two sizes, 8 x 12 inches and 10 x 18 inches. They pack in flat canvas bags, with a shoulder-strap like a school-book bag, and weigh with bread-board 2 pounds and 5 pounds, respectively. So long as flour, baking-powder, and corn-meal hold out, there will always be fresh bread in camp day after day, week after week, if you take along a reflector baker—also roast 'coon, 'possum, squirrel, duck, any beast or fowl

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that can be persuaded into an 8 x 12-inch baking-pan.

When a large party is on the trail, moving camp from day to day either by canoe, pack and saddle, or back pack, it saves much time and exasperation to have all the edibles in one or more side-opening tump-bags which can be hung up on stakes handy to the cook-fire. I described one of these in the *Sportsman's Workshop* some time ago. The bag is 22 x 9 inches diameter with long side lips and a stout maple stick through the hem of one side by which the two lips can be rolled up tight like a curtain roll. When all is snug, a sort of shawl-strap harness is strapped around the bag and it is ready for canoe, saddle, or shoulder-strap harness. The rig is almost water-proof and the 8-inch paraffined muslin bags inside are equally capable of keeping out water, so that an upset or swimming a ford will in no way wet down your provisions.

Arrived at the chosen camp site for the night, by the time the tents are up it is likely to be dark, and meanwhile the chef has his range built, the cook-kit unpacked, and the two provision-bags opened and hung by their maple sticks to a cross-pole on two stakes handy to the fire. An acetylene camp-lamp hung so as to light the whole cooking scene robs cooking by night of its terrors, and, as the provisions are used from the food-bags, they are

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returned to their place in the provision-kit, so that nothing gets lost in the dark. Two men make a good cooking crew, leaving the other six to put up tents, rig the sleeping outfits, and build the main camp-fire. It is hopeless to expect one man to cook for eight and besides rustle his own fire-wood and water. The worst meal I ever cooked was when expected to do that very thing. I had had a long, hard day's canoeing, with innumerable portages and down trees. Every one was dog-tired, and the rest just sat back and smoked, letting me chop my own fire-wood, haul the water, make the cook-range and get on the pots to boil. Presently the last of the fire-wood disappeared, the pots stopped boiling (the larger ones hadn't begun yet), and everything came to a standstill. It was dark and every one was hungry, but I preferred going hungry to bed to chopping up another supply of fire-wood, and told them so.

No, it takes two men to do any kind of a job. If the other man wants to cook, I am right on the job keeping up fires, fetching water, preparing the edibles, etc., and when I cook I expect him to do the same by me.

Finally, if even a stand of only two nights is to be made, it pays to put up an eating tent-fly and make a rough log dining-table. A sheet of water-proof green tent cloth 6 x 10 will weigh 3½ pounds and

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LOG BOWL, WIRE AND FORK BROILER, AND CLUB BAKER.

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can be stowed away with the cook-kit. While there are a dozen quick and easy methods, one way of putting it up is simply a ridge-pole nailed to two trees and the cloth stretched over it with a slight fall each way. In fair weather one can eat comfortably around a camp-fire with a plate in one's lap and a bowl in the hands, but when it rains you will enjoy life more standing up to a table on which are your plate, soup-bowl and coffee-cup with butter-can, sugar-bag and "cow" on the table, handy for every one. If you are to sit at a table, it is well to bear in mind that the standard height of it is 32 inches (or from the muzzle to the locks of your shotgun), and the standard bench height 16 inches.

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CHAPTER VII

THE CHEF ON THE TRAIL

THE subject of camp cookery is so vast, and there are so many kinds of camps and ways of cooking, that in this article but one phase of camp cookery can be treated, the labors of the chef on the trail; that is, the nomadic camp, either of a canoe trip, a hiking tour for big game or game-fish, or a pack-and-saddle trip through the mountains. The recipes, foodstuffs, cooking apparatus and how to use it, that I have had personal experience with will alone be dwelt upon; it may be something of an advertisement for these particular kits, but I cannot help that. Certes, I owe all of them much good-will—but others may write on other apparatus which they know about from personal use, and welcome; we are always glad to hear the facts. For it is a curious thing that thousands who purchase the standard nesting cooking-kits, or the various patent ones, little know how to use them fully, and might almost as well take along a lot of kitchen utensils and fry everything from grouse to oatmeal. Yet every first-class cooking-outfit is, and should be, a complete bakery, grill, "stewry," and frying-outfit combined, and

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every camper who buys one should know how to use it to the full extent of its possibilities.

In general, for trail cookery, one should know how to make fresh breadstuffs, to cook good, palatable soups, stews, vegetables, and desserts, to make such beverages as tea, coffee, and chocolate, to broil wild meats of all kinds, and to fry fish, flapjacks, and fritters without getting them greasy. Further than this, he should know how to serve these things without letting them get cold and indigestible. Even poor cooking will taste well at first in camp, as one's appetite is ravenous and the open air brings our bodily efficiency up to the 100-per-cent mark; but inside of a week I warrant you that such cooking will result in headaches and indigestional upsets and take half the pleasure out of your outing in the woods. But any good cook-kit can do all the above-mentioned cooking operations if you only know how to use it.

To make breadstuffs, you need as utensils mixing-pans and some sort of an oven or something that can be used as an oven; to boil soups, vegetables, mulligans, and desserts, you must have at least two pails, unless going entirely alone; for broiling, the forked stick, the wire grate, or the hot frying-pan will be needed, and, for frying, one or two small 7-inch frying-pans are ample, as the temptation is rather to overdo in this department. Wherefore, see that

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your cook-kit has the above necessities to do with. A wire grate is also a handy but not essential addition, and is a great convenience with a large party. I have made out with the cross-pole camp-fire and some pothooks for hanging over the cooking-pails, but it was not nearly so convenient as with a double wire grate that would take four pails from 2-gallon down to 4-pint, cooking all the vegetables, soups, and stews needed for eight persons. Other little conveniences that may well be added are a swabbing-stick for washing up, a gas-lamp so that you can see what you are doing when cooking at night, and a set of chain pothooks, which are easily stowable, light, and adjustable to any height over the fire desired. Also a pair of ten-cent cotton gloves, which enable you to pick up hot firebrands, pail handles and other calorific commodities without getting your fingers burned.

If the camp is a nomadic one instead of a permanent location, it is imperative to select only such foodstuffs as are light in themselves and to which many times their weight of water is added when cooking. There is no sense in packing a lot of water in the form of potatoes, green vegetables, meat, and eggs when every brook you meet is full of it, and you have a rifle or rod to accumulate fresh meat as you go. Your provisions should have an average capacity of making 6 pounds of cooked food for

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KINDS OF COOK FIRE.

1. Club baker and log bowl. 2. Emergency ration cook kit. 3. Reflector baker and fire for it. 4. The dingle-stick cooking-fire.

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every pound of provisions carried. Some of them, such as dried soup-greens, rhubarb, onions, and spinach, will make 15 to 20 pounds of food to the pound carried; others, such as erbswurst, dried egg-powder, and the various dried soup-stocks will make as high as forty times their weight of cooked food, but the bulk of your stuff, such as rice, flour, pork, corn-meal, and dried fruits, will run four to six times its weight in cooked food. From 1½ to 2 pounds of provisions per man per day will be ample in such foodstuffs, and they are healthy and nourishing and taste good. One never tires of them, whether out a week or a month.

Most veterans in the art of living out-of-doors and hitting the trail daily are agreed that the Indian and guide's way of two meals a day, with a light pocket lunch at noon, is the only way to get time enough to make progress. Wherefore, count on cooking a breakfast about eight times as substantial as the coffee, rolls, and fruit affair of civilization, putting away part of it for a warmed-up lunch at noon; and then when camp-making time comes, usually 3:30 to 4 P. M., in the spring and fall, or 6 in the summer, another tremendous feed will be assembled.

For breakfast, coffee is the beverage, two cups per man, and big, generous cups, too; you'd better prepare about a gallon for four men, made with a liberal

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grab of coffee-grounds to each man. Bring to a boil, let simmer for ten minutes, and then set on some hot ashes until wanted. I have made it in three kits, the nesting aluminum, the Forester aluminum and tin, and the Stopple pocket-kit with its large quart container. In the first two there is a special pail for the purpose, usually the smallest of the set. The worst coffee-pots I know of are the agate-ware and tin kitchen pots which fit nowhere in any known pack and invariably come unsoldered as to spout and handle in the camp-fire.

There are several good breakfast breadstuffs, all easily prepared, of which flapjacks, wheat cakes and corn bread are the ones most frequently used. Corn bread will stick under your ribs in a hard day's work longer than any of the others and is easily made in twenty minutes' time. My own recipe is: 1 cup flour to ¾ cup of corn-meal, 2 heaping teaspoonfuls of baking-powder, one level teaspoonful of salt, and a tablespoonful of sugar; mix these dry, add a beaten egg and enough milk-water to make a batter that will just pour, add a tablespoonful of melted butter, and stir vigorously. Grease your baking-pans, pour half an inch of the batter in each, and into the oven with them. This last sentence means more in camp than it does at home. If you have a reflector baker of the 12 x 15 x 8-inch size, the above recipe will just fill one pan nicely for a thick

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cake, or, better, divided into two pans, making two cakes about an inch thick when baked. Without a reflector baker the batter can be baked in the frying-pans of the nesting set, with one of the mixing-pans inverted over the frying-pan and hot coals on top. Set in a bright, clear heat, but not on live coals, or the bottom of the cake will surely be burned. With the Forester cook-kit, one of the large aluminum pots makes an ideal oven. There are three baking-tins, and this batter will fill two of them. Put the third tin empty in one of the aluminum pots, upside down, and set one of your pans full of batter on it. Put on cover of pot and cover it with live coals. The deep-lipped shape of the cover is identical with the cast-iron Dutch oven, and the pot makes a fine aluminum Dutch oven, being set right on the live coals. The pan inside is lifted by the inverted pan that it sits on, about an inch above the metal, so that the cake is in no danger of being burned. For the Stopple kit you would need about half the batter given by the recipe, as it will bake enough for one man at a batch. Fill the long frying-pan without a lip with batter nearly full, put on the pan with a lip, set the two on the grate with a bed of live coals underneath (not too low, to avoid burning), and some more live coals on top. In all three kits the bread is done in two batches, the second cooking while breakfast is in progress. The nesting aluminum and Forester kit will do

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enough for four men in two batches, and the Stopple enough for two.

For flapjacks I usually take along a small bag of prepared pancake flour, requiring only the addition of water or diluted evaporated cream to make a batter ready for the pan. Sometimes I enrich it with the addition of an egg or a spoonful of egg-powder; more often it is just wet down and fried forthwith. If done right, there is no reason why flapjacks should not form a staple and healthful breadstuff. Your care will be not to get them greasy, and the only way I know of to avoid greasiness is to keep a cup or container of pork or bacon fat on the side, pour a little in the hot pan, and then pour it all off again, every drop that will drain, back into the cup. The residue will be ample to do a cake, and it will be browned nicely—in effect a *baked* cake, not a fried one. About eight flapjacks per man is a good allowance, or four if you are getting them thick—a thing to be avoided. If you have a big party to deal with, use one large frying-pan and drop the cakes on it three at a time, turning them with the knife; otherwise the time-honored flip with the pan itself will do and is always provocative of much camp hilarity.

For breakfast meat, fried fish are usually the staple raw material, or else big game steaks sautéed in the frying-pan, the gravy left over being mixed with

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water and flour and cooked to make a "dope" for the cakes. To do your fish, fry first a generous slice of bacon to each man and set them aside in one of your mixing-pans to keep warm. Roll the fish in a little egg-white or egg-powder and then in corn-meal and fry slowly, with a cover over the pan. The process is really a sort of roasting, the hot fat forming an envelope around the fish. Be sure that your fat is screeching-hot when you put the fish in, otherwise the fat will get into the tissues of the fish and you will have a greasy mess. Allow ten minutes to each side of the fish, and do not get your fire too hot or you will burn the corn-meal envelope. Except for quick browning of pork cubes there is no use in a frying fire that will melt a gun-barrel; it burns everything before it gets time to cook. Fat reaches a temperature of some 350 degrees or higher at flash-point and therefore cooks flesh faster than any boiling process, which is limited to 212 degrees or less, depending upon the altitude; but even hot fat requires some twenty minutes to cook a steak or fish, and the upper side should be protected from cold by a cover over the pan. To meet this need, the covers of the aluminum nesting pots fit also the frying-pans; and the pans in the Forester kit do the same for the two aluminum frying-pans which come with the set; also the lipped pan of the Stopple kit is arranged to perform the same service for its

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second frying-pan. If fresh game fails you, there is recourse to creamed codfish and pork cubes. I always carry a little codfish along—in the steak form, not the shredded—as it is one of the lightest and most compact and nourishing forms of flesh. All it needs is two boilings to get out the salt, pouring off the water after each boiling of, say, ten minutes' duration. Then add a thumb of butter, a tablespoonful or so of evaporated cream and a little flour for a thickener, stir, and boil for five minutes more, and it is ready to serve. Pork cubes are delicious with rice. Cut the expeditionary pork into dice size, fill a frying-pan with water, and parboil the cubes until they swell up to about twice their former lineal dimensions. Pour off water and fry lightly to a nice brown; beware of overdoing this, for pork is very prone to "try" out, leaving nothing but a mess of bitter, wooden, burnt cubes behind. If browned over a red-hot fire and tumbled immediately out of the pan and mixed with rice, they are very succulent and make a good breakfast meat.

For a cereal, oatmeal is the old standby, the three-minute varieties being best for camp use. Bulk oatmeal has not been precooked long enough at the factory and usually requires twenty minutes at least of careful boiling and stirring to be ready to eat; and there is no comestible more prone to burn nor more mussy to clean up after than this

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ALUMINUM TABLE SET ON LOG-AND-GRAVEL TABLE.

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same oatmeal. For this reason some camps have discarded it entirely, but I generally take it if there is room, for it is light and sustaining and very palatable with sugar and evaporated cream. Cook over a slow fire about ten minutes, the longer the better, so that you do not burn it. The two best cereals for breakfast are corn-meal and rice, using the former if flapjacks are the breadstuff and the latter if corn bread is being baked. Take one of the gallon pots of either the nesting aluminum or Forester cook-kits, put in a grab of corn-meal or rice to each nose, and add a teaspoonful of salt. For corn mush just enough water to hydrate the meal is to be brought to a boil and the corn-meal stirred into it; for rice, fill the pot nearly full of water and add the rice. It should then boil furiously for thirty-five minutes, when the rice-water is drained off and saved for soup-stock and the rice left to steam itself nearly dry. With the corn mush stirring and occasional addition of water will be necessary. Serve with sugar and cream or as a vegetable on the side with the meat. It is also delicious fried and may be served so if there is time and some bacon fat to use up.

No camp breakfast is complete without a liberal deal of fruit. It is not only a general intestinal regulator, but serves as a basis for the assimilation of sugar, one of the three elements of bodily nutriment. All outdoorsmen, when working hard on

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trail life, crave sugar and will even pack a big tin "log cabin" full of maple syrup, making their back serve their belly to satisfy this craving. There is no doubt but that sugar is one of the heaviest provisions carried, no matter in what form, but there is no leaving it behind, for none of the tabloid substitutes are anything but sweeteners, intended only to satisfy the palate, being in no sense nutriment, but rather a drug. I always carry four kinds of dried fruits: apricots, apples, peaches, and stoned prunes, and mix them together to make a tutti-frutti fruit stew, with the addition of sugar and water. Until you have tried it you have no idea how these four supplement each other in their various qualities. Dried apples, alone, seem to lack enthusiasm, apricots are a bit too tart, peaches are disappointing, and prunes are medicine. But mix them and you will take out of that pot, after some twenty minutes' slow stewing, a dessert that your palate will fly at with rapturous relish, no less!

The midday lunch has always been a fascinating problem to me. No one wants to stop travel or hunting or fishing to get out the whole cook-kit and build a regular feed, yet we must have a bite! One pot should suffice, and that will do tea or chocolate, preferably the latter, over a small fire and a dingle stick scratched up out of the brush. Chocolate is really wonderful in the amount of sustaining food

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that it packs in a tiny compass. A teaspoonful to each person is ample, and a small bag of it, 4 x 6 inches in size, will hold enough for a whole trip. It needs about twenty minutes' boiling, and the evaporated cream and sugar should be stirred in while boiling. With it you want a sandwich saved over from breakfast, a handful of nuts and raisins, a pipe, and a rest. The whole operation will not take over an hour from the time you start looking for fire-wood until the kit is repacked and you are on the trail again.

When the day's work is over and a definite stop is made for the nightly camp, the cooks in the party should set about at once on the Big Feed, leaving the tents and browse to the others. The assistant cook's first duty is that of fire and water commissioner. While he is getting the canvas camp-bucket filled with fresh water from the brook he should see to it that the larger pots are filled also, to give the chef something to start on. If there is a wire grate in the outfit, it is set up, and the assistant cook splits a grid of 2-inch logs of black-jack oak, red maple, pignut hickory, or birch for it. For the pots a camp-fire cross-pole is rigged. The classic form of this is two forked stakes and a cross-pole, but forked stakes are hard to drive and not easy to find off-hand; so I usually carry a pair of small lengths of copper wire to fasten the cross-pole with and have

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done it with ordinary twine. Either wire or chain pothooks are next gotten out and hung from the cross-pole, the fire started, and the larger pots hung over to boil. The nesting aluminum sets have wire pot bails; the Forester pots have a rigid aluminum handle on the cover, and the cover is held to the pot by two side snap-hooks, so that it can be lifted or carried or hung by its cover. Our proposed menu will be soup, stew, a vegetable, a cereal, fried or broiled meat, biscuits, fruit and tea. That's quite a feed when you come to add it up, a gallon of each to every four men. For soups I have found the prepared powders sold at the sportsman's stores excellent, only you *must* follow the directions on the package. For instance, take mushroom powder. If properly cooked it will give twenty plates of as delicious a soup, tasting something like chicken purée, as you ever ate, and all from one little package about 2 inches, cubed and weighing but a couple of ounces. If you just tilt the powder into a pot of boiling water and go off and forget it you will get a queer beverage, hardly palatable, and will find most of the powder, still uncooked, sticking to the bottom of the pot. Most of these powders are to be first mixed with cold water until the powder is thoroughly dissolved, and then stirred into your boiling pot and afterward stirred frequently until each grain of the powder has taken up its proper amount of water

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and swelled up to a good many times its dehydrated bulk. Some of them contain two separate packages of powder, which are to be moistened separately and then stirred into the pot. I vary these soups with home-brewed decoctions of my own, of which the following is a sample: Slice in one potato or equivalent of dehydrated potato, one onion or the same in the dried onion chips, a handful of dried soup-greens, a little rice, ditto macaroni, ditto celery salt, and boil in your gallon pot for half an hour. Just before serving stir in one beef-extract cube to each person, and you will have as appetizing a soup as four men ever ate! If there is fresh game in camp, all the bones and odd scraps of meat are put in with the above. Erbswurst-powder is also fine, added to any soup mixture or served alone. It positively *must* be boiled at least fifteen minutes to become palatable and digestible. It is, essentially, ground-up and dehydrated pea-meal already partly cooked, with fine powder of bacon mixed with it, and the whole compressed into a paper cylinder about the size of a candle. This powder will swell up, every grain of it, to such a bulk that a teaspoonful of it will make a cupful of thick soup; but it requires fifteen to twenty minutes' cooking, with occasional stirring, to do this; and one should not serve it while any of the powder still has a tendency to settle on the bottom of the pot, for that is a sure

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sign that it is not yet cooked. The particles will float in the liquor when done.

A second pot will be wanted for your stew. The basis of this is game, either chunks of animal flesh or birds. The latter are quickest prepared for the stew by opening the skin at the breast, ripping off skin, feathers, backbone, and entrails in one fell swoop, and then cutting off legs and rump from the residue. You have, then, practically, all the meat of the fowl worth saving, and it is quickly done without any muss or feather-plucking. I once saw Frank Stick prepare six grouse for the mulligan this way in about five minutes' work. In the stew goes rice, erbswurst, macaroni, with potatoes and tomatoes if there are any such heavy and bulky provisions along; otherwise the dried varieties are just as good and will be there, full size, good as new, restored to life again, when the mulligan is served. For a vegetable, boiled rice or macaroni, both prepared in the way described above. For breadstuffs, biscuit, or corn bread. The former are easy to make in camp. Mix a cup of flour, a teaspoonful of baking-powder, a little salt, and a tablespoonful of pork-fat suet. This latter is to be mixed in thoroughly with the hands, working it over and over in the mixing-pan until thoroughly incorporated into the flour. Add one cupful of diluted cream to make a stiff dough. Roll out on the back of a large plate, handling gently,

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and having plenty of flour on your hands, on the roller, and on the plate. Cut out biscuits with the top of the baking-powder can and put them in your baking-pans, first sprinkling a little flour on the bottom of the pan. Bake as with corn bread. The things to guard against are getting too much suet, or shortening, and handling or beating your dough too much; also putting the biscuits too close together. They want room to rise and swell up. The fruits for dessert I have already spoken of, and, as for tea, all it needs is steeping four or five minutes in water which has been brought to a boil. I prefer the Ceylon teas because their grounds settle to the bottom of the pail when steeped, so that they will pour without a strainer, though the nesting aluminum pails for tea and coffee already have an inside strainer. In making the above meal four pots will be wanted, which the nesting aluminum outfit has; but with the Forester it is necessary to make one of the mixing-pans do duty to stew the fruit, as the kit has two gallon pots and one three-quart pail, all of which are on duty elsewhere.

Let us look over these three kits, close at hand, to see just what they contain and what each article is for. Beginning with the four-man nesting aluminum outfit, there are three nesting pots, the largest about 9 inches by 7½ inches, holding 13 pints or over a gallon and a half; one 9-inch and one 10-inch

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frying-pan with detachable handles; one tea and coffee pot, 6 x 6 inches, holding 4 pints; 4 plates, 4 cups, 4 soup-bowls, 4 knives, 4 forks, 4 teaspoons and 4 dessert-spoons. Weight about 8 pounds, size 10½ inches diameter by 8½ inches high. The outfit seems to lack mixing-pans, as furnished, but these can be added in the 11 x 4-inch size to fit over the largest pot.

The Forester outfit is a mixture of tin and aluminum utensils, on the principle that, while aluminum is essential for the large utensils and the plates one eats off (because the cutting of knives on tinware soon rusts and ruins the utensil), there is no reason why baking and mixing pans, small plates, etc., should not be of light tin. Furthermore, the space inside the cook-kit is the best place to carry all small provisions, such as tea, coffee, butter, condensed cream, salt, corn-meal, soup-powders, beef-cubes, chocolate, baking-powder, etc. These things are perishable, easily lost in a pack-sack, their packages will break and open out all over everything under the strains of the pack rope or harness, and most of them are ruined if wetted. The outfit, therefore, comprises two gallon aluminum pots, 7¼ inches diameter by 6½ inches height, which go back to back in a lacing-up bag, suitable for a pillow at night; two 7 x 3-inch tin mixing-pans, three 6½ x 1-inch tin baking-pans, used also for soup-plates;

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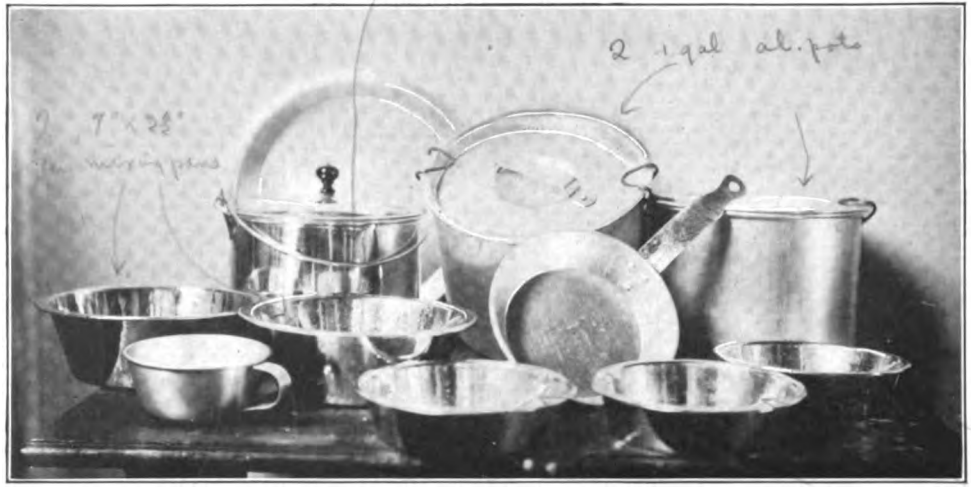

THE FORESTER COOK KIT.

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three 6-inch tin plates, one 9-inch aluminum plate, two 7-inch aluminum frying-pans with handles, one aluminum cup, and one tin tea-pail of about 7 pints' capacity, used for tea, coffee, chocolate, stewed fruits, etc. Weight of Forester kit 4½ pounds, size 13 x 7¼ inches diameter. No knives, forks, or spoons are furnished, though there is plenty of room for them. Most campers have their own table outfit of this kind, the cook-kit being a separate institution, and any one purchasing one would hardly care to load up with a lot of tableware which he personally would have no use for. In fact, in selecting any of the standard nesting aluminum ware one would do well to pick out such utensils as will suit his individual needs, always providing that the utensils will cook for a party of three or four, and that they all are of the proper sizes to nest. Room is generally found for the tableware, cups, bowls, etc., inside the coffee-pot, or they can be carried elsewhere and small provisions stowed there, particularly if each member of the party already has his own personal eating kit.

The Stopple kit consists of an oblong rectangular pail holding a quart, 9 x 4½ x 2½ inches inside, with two big cups, each holding nearly half a quart, fitting over each end of the large container. Inside of it are two sheet-iron frying-pans, one with a lip fitting over the other, the size being 8½ x 4 x 1¼ inches deep. Detachable wire handles are provided

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for all the utensils. Inside of the pans is a folding grate, which opens out to form a grid about 8 inches square. There is also room here for the wire handles, several forks, spoons, and one large stirring-spoon. The rig answers very well for two men and I have given methods of using it earlier in this article. The quart pail stands in a wire bracket forming part of the folding grate when cooking, and will come to a boil from the flames under the grate playing around it while you are using the frying-pans. I have gotten many a meal quickly and easily with it and doubt if it can be beaten for a one-man or two-man outfit. Two of them, one to each man, would give the chef quite a layout. For example, he has two quart pails, one for tea and the other for soup; four half-quart utensils, one of which can do a stew for two while the other does your fruit, leaving the other two for cups. Two of the frying-pans will take care of fish or flesh, while the other pair prepare your breadstuffs. For quick and handy getting up a light meal this combination is good. One must study his fire, as the grate is small; I usually keep another fire going alongside the grate and transfer coals and brands to it as needed. For larger parties than two, you want the kits with gallon pots, as it is a serious matter to feed four hungry men, with the cook's reputation hanging in the balance, and one must have the things to do with!

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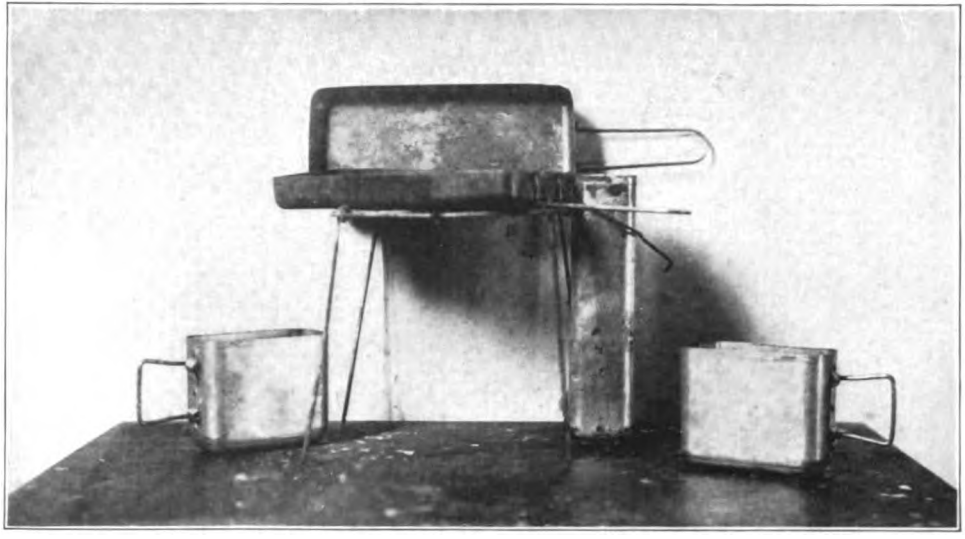

THE STOPPLE ONE-MAN COOK KIT.

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A word in conclusion as to carrying bulk provisions. For a party of four or five men for two or three weeks' grub, the best scheme I have yet encountered is the paraffined muslin food-bags, 8 inches diameter and 6 to 10 inches height. These collapse to flat packages like thick, round pancakes when packed and piled one atop the other in the food-bags. To get the one you want without pawing over all the others, a side-opening tump-bag is the thing, and when rolled up tight and strapped this bag is as rain and water proof as the standard 10-inch end-opening tump-bag. For short trips for four men or for long ones for one or two, these round muslin food-bags are too large and introduce too much waste-bag material in packing. So far I have met no company that puts out small paraffined muslin food-bags, except one that made up a set to order for a Western sportsman who ordered them specially for his own use; but I have made up at home a set of 4 x 6-inch and 4 x 10-inch bags of paraffined sheet muslin, bought from the outfitters', besides some smaller bags, 3 x 4-inch, for such commodities as tea, salt, and chocolate, and I use these for all trips where not over 10 pounds of provisions are to be carried. All the smaller bags stow away in the cook-kit, while the larger ones find a place in the pack-sack. None of them holds over 2 pounds, and the smaller ones less than half a pound, which will be

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found to give ample quantity and variety for all one-man and two-man trips, and even for four men for a week-end camp.

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CHAPTER VIII

TRAIL ACCESSORIES

THERE are quite a few minor essentials in wilderness equipment that do not loom up very large or very important in the beginner's eyes, but which have received quite as inexorable an evolution in the hands of the professional woodsman as the larger necessities, such as rifle, rod, tent, cook-kit, and sleeping-rig. I refer to those lesser, but equally needful, accessories, the axe, knife, compass, camp-lamp, repair and cleaning outfits, sharpening-stone, match-safe and medicine-kit. Some of these things look superfluous to the inexperienced man—who is quite ready to borrow yours upon occasion—but there will surely come times when the wilderness will ask him personally for each and every one of these accessories, and there will be no old-timer around to lean upon and borrow from.

Most of them you are using around camp all the time, so they must be of A-1 quality and kept right up to the mark if you are to have any peace of mind. Here is where the poor steel knife, the axe-with-the-head-always-coming-off, the lamp that blows up or out in the wind, and the compass that requires

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a feat of memory to know which end of its needle is north get shown up. The acid test of their owner's well-being comes upon them and they fail. If some one else is around to lend the real article, well and good, if not—woe to you!

There are not so many of these accessories all told, so it is well worth the effort to strain the financial rigging a bit and get them of the best quality. A belt-axe that costs you less than about two simoleons is just no axe at all, merely a poor heavy thing whose edge and head alike are always coming off. The knife that will really serve you when it comes to skinning out a tough old hide is no cheap iron affair with hilt and handle all wrong for real work; it is rather an extra fine bit of steel, with a handle that has been evolved out of the needs of hunters who follow the art as a daily occupation, and it will set you back not less than one dollar and fifty cents. No matter where one hits the list of accessories the same rule holds good—there are two kinds of them, the sort that always has something out of order and do not somehow fit, and the kind that are always "all there," good and plenty, with something left over for extra hard duty.

Like everything else in outdoor equipment, a good deal depends upon the country, the time of the year, and the kind of trip one proposes to take. For example, on a canoe trip or a pack-and-saddle trip,

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in cold weather, a sharp three-quarter axe is a necessity for fire-wood and down trees, although the party is well-provided with belt-axes and *could* get along with them alone. On a hiking or toboggan trip in winter the Hudson Bay axe takes the place of the three-quarter axe (although again a sharp belt-axe alone would answer), because with the light, keen head and long handle of the Hudson Bay axe one's swing radius and cutting power are enormously increased, and, as there is a lot of night wood to cut, it meets the requirements admirably. The same axe would be in the way and a nuisance in a summer or early fall trip afoot, where only one axe is to be taken, and that one, of course, your belt-axe. For the latter is your most inseparable companion and it cannot be too well made. Strapped over your left hip, it goes with you every day on the hunt away from the home-camp; around camp it is constantly being used for everything from driving tent-pegs to whittling shavings in starting a fire; in the canoe or in thick brush it clears the way; and after the kill it is your butcher's cleaver *par excellence*. As nothing drags one down so as a heavy load on the belt, it must be light, not over 24-ounce weight, and to make this light weight effective in cutting logs for camp-fire and bed, it must be keen and hold its edge. Not a brittle keenness that chips out on hard knots or when used as a screw-driver to open up

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the rifle, but a mild, somewhat malleable keenness that only the best steel possesses. The head should have a nail-claw somewhere on it, for one's stock of nails is not to be lightly wasted, and all should be pulled out and taken along when camp is moved. The head must not come off, no matter how much used, and this cannot be insured against except by some sort of expansion bolt or screw-and-wedge device that positively prevents the head from coming off. All kinds of driven wedges have failed in belt-axe work, and an axe with a loose head had far better be left behind. The helve should be stout and broad where it enters the head, because the usual way to drive a peg or stake is with the flat of the head, since the face of it is sure to split green stake timber, and if the helve is weak at that point it will break and leave you axeless in the tall uncut. The helve should be properly curved, so that the shock of cutting will not vibrate up into your palm and hurt you worse than it does the tree, and the helve must have a large, generous stop on the hand end, so that you can swing at full arm's length, with no fear of the whole axe flying out of your hand if you miss a swing or cut clear through or strike a glancing blow that tends to wrench it out of your grip. It is thus apparent that the belt-axe is quite as much a poem of construction as a fine violin, and many a keen mind has labored over the evolution of the

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ideal. Some of them are of the standard axe-poll shape, some double-bitted and others of the tomahawk head. All require some sort of sheath or guard, the latter usually folding into the handle when not in use. My own axe is of the standard poll shape, of the finest Damascus steel, weighs just a pound and a half and has been with me constantly for over five years. It has been sharpened twice, and once has had the screw in its head taken up. Otherwise it is as good as new, and I often cut twenty logs of 3 and 4 inch night wood with it, besides cutting all the tent-poles, stakes, and cook-fire wood needed, and this service has extended over fifty camps of all kinds and in a variety of countries. I would not part with that axe for any consideration, as I have a superstition that it is an exceptional piece of steel. The helve is 13½ inches long with a 2-inch stop on it, a thin, tough, hickory shank broadening to 1¾ inches where it enters the poll; case of leather, reinforced with rivets along the blade and fastened with two snap-buttons. We have two other belt-axes in the family, both of the folding-guard variety with tomahawk head, the latter to get as much weight into as great a swing radius as possible. Both of these axes have seen much service for camp use, and neither has given any trouble from the head coming off or the edge giving out unduly. They are invaluable for cutting brush,

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tent-poles, stakes, and light fire-wood, and are just about the right weight for their users, 16 and 20 ounces respectively.

The double-bitted axe was first reduced to camper dimensions by Nessmuk, of revered memory, who had one made to order for him. It has since been put on the market, and can be had by any one who wants two edges on his axe, one keen and sharp for soft cutting and the other more blunt for bones and hard knots. The principal difficulty is to get a good stop for the helve, as the stop should slope to fit your hand, and it is impossible to slope it both ways. Nessmuk avoided this by wrapping the helve and providing as much stop as could be reversed without interfering with the grip, and the same result could be obtained to-day with bicycle tape, the way the handle of a bat is wrapped. A very neat, keen, light, double-bitted belt-axe can be made for you by any blacksmith if you get him two large, flat files from the used stock of any machine-shop. They are always glad to sell off any worn-out files on hand, and the blacksmith will weld them into an axe head with a hole between for the helve, and rough shape the blades for you. A session with the grindstone and a final tempering will give you a light, double-bitted belt-axe weighing about a pound. Bob Davis, the world-renowned bassologist, is the landlord of the first one of these axes I ever saw.

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The question of knives is as lengthy as some of the bowies themselves, and, like the rifle, it is hard to get an all-around one. There is the heavy, long brush-knife, which aims to do away with the belt-axe, and there is the light skinning-knife not intended for hacking of any sort. Personally, I prefer to keep my belt-axe sharp for all hack work, and use a light, keen knife, with a blade especially adapted for skinning purposes, though not as light as the out-and-out skinning-knife. Every man to his taste, only let it be *one* knife, as there is no room for two about your belt, and the pocket-knife is a separate institution, those with combination tools of one sort or another being especially serviceable on the trail and well patronized, especially by people who carry along only an ordinary pocket-knife and borrow yours. Mine weighs 6 ounces and has a 3-inch blade (excellent for difficult skinning), a 2-inch blade, fish disgorger, corkscrew, screw-driver, scissors, tweezers, awl, reamer, and two large needles for canoe and canvas sewing. All of these tools have been used, dozens of times, on various trips.

The sheath that the hunting-knife is slung in also required considerable evolution from the scabbard that the old desperado knife used to fit in, more or less. Its principal function is to keep the knife from falling out, and yet swing it in such a manner that it will neither dig into your groin nor make a one-

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legged stool of you when you kneel down. Anything rigidly strapped to your belt is sure to do this, and so was evolved the long sheath, coming well up on the knife handle, so that it would not drop out in any position, and loose-hung to the belt so as to tuck away automatically when its owner stooped or squatted over camp-fire or game-sign. As the old brass tip proved more a weapon of offense than the knife-point itself, it was discarded for a well-sewn tip, guarded with a few rivets properly placed, the stop of the knife handle preventing the blade from being driven through from above.

Time was when the barn-lantern and the converted bicycle-lamp, or miner's lamp, was the sole illuminant about camp, and both of them, with their kerosene-oil fuel, were such a nuisance that we came to depend upon firelight and a carefully guarded candle for such light as we absolutely had to have. This made night going through the brush a debatable matter and enforced the rule of getting back to camp before dark. But the new gas-lamps have changed that considerably. Light and easily carried, giving a splendid, efficient illumination, almost impossible to blow out in anything short of a gale, they soon found their way into the old-timer's pack—the acid test of serviceability! Not that they superseded the sure-to-run candle, as no woodsman would go anywhere without his thick, fat candle

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stowed away somewhere in the duffel and brought out triumphantly when the gas-lamp is temporarily disabled. But the candle is now in reserve, to be used principally for temporary lighting or at the tail end of the evening, when the gas-lamp gives signals of needing replenishment and no one wants to start in on a new charge of carbide, as all hands are preparing to turn in. It will be conceded that the writer of this work is not apt to take along any unnecessary duffel—he has even been wrongfully accused of going on a three weeks' trip without even a tooth-brush—yet I would not go on any camping trip without taking my little gas-lamp, its two receivers crammed with carbide, and a small friction-tin containing a few more charges. I have used two types on the market and have no preferences, but I will back the gas-lamp against any other comfort you can carry that weighs under 6 ounces. Stuck on a twig, I get the evening grub in peace by its light while the fire is naught but a bed of glowing coals and the stars are shining overhead; carried in the hand, it has often guided me through the woods for an early start before daylight after big game, and, returning late at night, it has lit up the compass-dial (a "luminous" one at that), and steered me through swamp and brush miles and miles back to camp; perched on a shingle, it has lit up the beach for yards around while a party of four fished

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the surf at night; and hung from a grommet hole in the tent-flap, it has illumined our dining-service and lit us off to bed night after night, never failing while there was a cubic inch of gas still left in the carbide. Would I go back to the old days of dark tent, feeble candle-light, blazing cook-fires that scorched the good mulligan the while it gave us light to see and also impenetrable shadows to explore where some indispensable article was lurking under the leaves? Hardly!

In principle these lamps are exceedingly simple. The upper compartment contains water, or any other liquid comprising mostly water, and there is a small brass drip-tube in one type, inside of which is a brass rod, the clearance between the two forming an automatic drip-feed. In the other the drip is controlled by a screw drip-valve. The receiver contains enough carbide crystals to last a given time. Judged by previous experience, three-quarters full lasts three hours. You do not fill it any farther because the crystals swell with the addition of water and fill the whole receiver. With the drip-valve screwed down tight, you screw the receiver to the lamp, making sure that your gasket joint on the receiver fits gas-tight. Then open the drip-valve, whereupon with one type the drip-feed starts, allowing just enough water to drip on the crystals to make a nice flame 1½ inches long, depending

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upon the relation of the clearance to the hole aperture in the burner. In the other type, the length of flame may be adjusted by hand, as it can also in the automatic drip type within certain limits. If it appears longer and evidently under considerable pressure you are giving it too much water, and will lose a lot of unburned gas, as it *must* escape somewhere, and will bubble up through the water by way of the drip-valve and force its way past the rubber gasket on the receiver. So shut down on your drip until you have a steady, nice flame and then leave it alone. In the course of an hour or so the drip may clog from waste crystal matter swelling up into the end of the tube. There is a little wire rod projecting up through the drip-tube for the purpose of freeing this deposit on the lower end, and all you have to do is to pump it up and down a few times or rotate the wire. Occasionally a carbon tit will form on the burner and obstruct the flow of gas; knock it off with a knife blade and all will be well. This is about all the care your gas-lamp needs, except an occasional cleaning of the felt filter which separates the receiver from the exit to the burner. If you have been filling the receiver too full of crystals they may swell up and clog this felt filter with carbide mud, or if you have given the crystals so much water as to drown them and then have shaken the lamp about too much in carrying, besides dropping it a few times, the filter

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again may get clogged. Otherwise it will run nicely, rain or shine, windy or still, in almost any old position not actually upside down, and you can light it from the camp-fire, a glowing ember, a flint-spark, from a spark wheel in the reflector or even the snap of a match. I usually start out with both receivers full of crystals and use half of one the first night. The crystals spoil rapidly when exposed to the air and must be carried in an air-tight tin, but that first half charge will answer very well overnight if put away in any covered container. Next morning the receiver is washed clean, dried over the camp-fire, and the second half put in. The two receivers last four nights and the friction-tin holds three more charges, so I have a week's supply of light on far less room and weight than the equivalent in candles. And "dar is" a candle lurking in the ditty-bag for emergencies, too! If the gas-lamp burner gets knocked out or broken it can be replaced immediately with a spare one or with a .22 empty cartridge with a very tiny hole made by a tack-point, and if the wire gets lost a straightened hairpin or a bit of straight iron wire or just a plain wooden plug in the top of the valve nut will do as a makeshift. And at the end of your trip the gas-lamp is presented to your faithful guide, who by that time is an enthusiastic convert and wants one more than your gold!

The next accessory on our list is the compass,

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something that you positively cannot do without, even on a fishing trip where you live in a fisherman's hotel every night of your stay! I once went on such a trip with that great fisherman, Bob Davis, who spent more time scoffing at my woodsman's outfit than he did catching fish. The compass came in for its due share of scorn—but wait! Of course, it would be impossible to get lost fishing anywhere on that lake—oh, sure! Why, in the name of Ike W., take along a compass, then? Well—we went out one fine morning, trolling for lake trout, and in the midst of our frolics down came a fog as thick as pea soup. We weren't more than a mile from shore, and Bob had the oars. I let him go as far as he liked—and it was a good long mile, too! We didn't seem to be arriving anywhere. . . . How long was this lake, anyway? . . . Would that fog *ever* let up? . . . Finally some deft interpellations were thrown out as to the needs and uses of a compass. Did I have the "dad-blasted" thing along, and would it show north or just a white and black needle which no one could tell anything about? I wish I hadn't trotted it out just then, for when its dial came to rest it yielded up the information that he was rowing straight down the lake, at right angles to our proper course, and with five miles of good rowing yet to come before we could bump up against the unsympathetic rocks under the mountain at the far end!

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A good compass is not necessarily an expensive thing, but there are some features it *must* have to be serviceable in the woods. It should be totally enclosed in some form of metal case or have a metal cover so that it will not get broken in packing; it must be easily carried on your person, have a special pocket for its carrying, and must be capable of being used at night. This latter requisite has not yet been satisfactorily solved by our manufacturers, as the various luminous compasses sold must be exposed to the sun at least on the day before using or the luminous part of the dial will not show at night. As no one ever remembers to do this, it turns out as a rule that when the emergency arises the dial has not been exposed that particular day, and the compass is useless without a lamp. Yet a hunting-case compass could be gotten up in which the base is a small battery serving a lamp in the cover which could be flashed on at will, and if one of our optical companies interested in outdoor equipment would put such a compass on the market it would be well patronized. However, as we have no such thing yet, let us get along with what we have. A good luminous compass, with the north end prominently marked, can be had for two dollars up, and the cheaper but serviceable non-luminous compasses will answer very well if you are a smoker and can get a glow from cigarette or pipe as you go along.

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Or, combined with a small pocket-flasher (which is a tremendous convenience about camp, anyhow, to find things in the dark), you are able at any time to rectify your course. In night steering, lay your course for camp, and then steer from one prominent object on the landscape to the next. There will be always a dark blur on the darkest night which is a rock or a clump of trees lying more or less in your course, and, having reached this landmark, take a look at the compass and pick out another one, correcting as you go. Cruising in the deep timber at night is a bad business and dangerous to life and limb—as bad as chopping wood at night—and it is far better to den up than to attempt it. Of course, following a trail at night is another matter, and in that case you need lamp or flasher more than any compass.

The carrying of matches is another detail of more importance than it seems at first blush. A ten-gauge or twelve-gauge brass shell, corked, makes a fine emergency match-safe, one that cannot under any circumstances be drowned and that will float if dropped overboard. Screw-top rubber and metal match-safes are on the market for about forty cents, and there are a lot of flash-lighters with spark and gasolene wick which are worth investigating. All of them work on the principle of saturated vapor of gasolene given off from a wick in the pres-

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ence of a steel-and-flint or steel-and-pyrites spark. The reservoir holds cotton saturated with the gasolene, and the burner is either immersed in it or forms the end of the wicking. A spark is had by rubbing a steel against a bit of pyrites or a chip of flint. The same idea has been lately applied to the burner of the acetylene gas-lamp, and a new lamp having this device has appeared on the market.

As a rule you need three supplies of matches, the main store in a friction-top, air-tight tin (mine is 2½ inches diameter by 3 inches long); the daily supply for pipe-smoking, etc., usually an ordinary match-safe or some of the papers of waxed pasteboard matches; and, finally, the emergency matches, always on your person and carried in a special water-proof shell with the matches wrapped in a few folds of birch-bark tinder. When these are used you want a fire and want it badly, and the birch will save a hunt for tinder to start things going. It is also well to know that safety-matches will strike on glass in case you find a last one in your pocket and no corresponding box with its phosphorescent striker. Without a match the only sure way that I know of to start a fire is with the rifle, with bullet and most of the powder removed from a shell, a train of powder laid down the rifle-barrel and the rest spread on your tinder. When the woods are wet I am sceptical as to whether a fire can be had

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with the rubbing-stick. I once tried it out in a February blizzard, taking the dry heart of a young white pine for drill and fireboard and using my moccasin thong for the bowstring. I was ready to start fire-making with woods-made apparatus in about half an hour from the time I first drew my axe and went into temporary camp under a huge white pine; but over a dozen vigorous attempts resulted in nothing but plenty of smoke and *almost* the vital spark; but never would it fan to a coal. In that country there was neither balsam nor white cedar to be had without long and continuous cruising, and white pine direct from the dead tree is too damp and resiny to get a live coal.

How to assemble a light and compact yet efficient medicine-kit is quite a problem. The ones shown in the outfitters' catalogues are excellent, and one of them ought to be ample for a party of four men on an extended trip. As I go a good deal alone or with one or two companions, I have to have something smaller and lighter, yet able to take care of every one, for few campers seem to realize that one kind or another of sickness or accident is pretty sure to overtake them on every trip, and many an old-timer has been doctored out of my kit, too. The kit is just a tin-box 3½ x 2¼ x ⅝ inches in size; weight, loaded, 2½ ounces. It contains: A roll of surgical bandage 2 feet long by 3 inches wide, already treated

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with antiseptic solution (smells like iodoform); a piece of surgical tape 16 inches long by 1½ inches wide; a small tube of carbolated vaseline; a safety-pin; ten two-grain quinine capsules; ten bismuth tablets for diarrhœa; one dozen small fever tablets; one dozen quarter-grain podophyllin pills for liver troubles and constipation; six headache pills; four bronchitis tablets; the little burner cleaner for the gas-lamp; sewing-needle and thread; a button; heavy needle and shoe thread, and a paper of burnt-rag tinder. It may seem incredible that all this can be contained in such small weight and size, particularly to those literal souls who put down what they *think* each separate item ought to weigh and then add up the total, but that is what the box weighs and measures on the scales. Doctor Ackerman, of Asbury Park, pronounced that kit the lightest and most complete he ever saw, and he is "some" authority in the medical world, too!

Not that it is in any way held up to an admiring world as a model, but that it illustrates what can be done in the way of saving weight and space by omitting that cute little row of glass vials with their leather compartments and putting all that space into pills. Better a plain tin case that is always on the job than a handsome leather-embossed apothecary shop that is left behind in the trunk.

Extraneous to the medicine-kit, but closely allied

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to it, is the tube of fly dope. I take one along, not that I ever had much relief for more than half an hour after painting my pelt, but as a standby in case anything happens to the net, which, if a good one, is an accessory of the first rank. Things *will* happen to it, like fire-sparks, rips from unsympathetic or openly hostile underbrush, and getting lost in the shuffle; so take two of them, of the kind that go over your hat and secure to straps around your shoulders. While under way in a canoe the pests do not bother much, but in making and breaking camp at dusk and in the early morning they are at their worst and a head-net is a boon. With it goes the ten-cent cotton glove, which protects the hands not only against mosquitoes but around the camp-fire, making one immune from burns, master of the overboiling kettle, and able to do anything one chooses about picking blazing brands out of the fire or readjusting their position. Without the gloves it is almost impossible to avoid burns, and your skin is not tough enough to let you put your hand in or near a hot fire for a quick grab at a utensil, a pot cover or a brand that wants fixing, all of which is easy to the man with the cotton glove. They also prevent that unspeakable grime which otherwise crocks itself in every crack and crevice of your hands on long camps in spite of much use of soap and water. Formerly we bought the gloves in unblushing and

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staring white and toned them down with fire-dirt, but they can now be had at any hardware store in brown as well as white.

For a rifle or shotgun cleaning outfit you do not need more than a simple rope outfit and a *good* oil-can, one that will hold such insidious oils as the new nitro-solvent preparations without leaking. The cleaner is a brass scratch-brush with a stout twine attached to both ends of it by small brass couplers. It weighs 1½ ounce and packs in ditty-bag or war-bag along with the oil-can and a rag or two. Hitch the loop of your twine over a twig and pull the rifle-barrel over the brass brush, pulling it back with your right hand, the rifle being held in your left. Simple and effective. To clean a shotgun with it, tie a rag around the brass brush and "go to it." The oil-can should have a screw-top with a rubber or parchment washer. No metal joint, however tightly screwed, will hold nitro-solvent oils, with the result that when you want to use it the can is dry and your pouch has a suspicious smell about it—something like a creosote factory.

And do not omit the auxiliary cartridge, or "supplementary chamber," as it is called. They are made to adapt almost any high-power rifle to some one of the low-power pistol cartridges, and the accuracy at short ranges of these latter is ample for all meat-in-the-pot chances. They make little noise, and as

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one is always coming upon grouse, rabbits, chickens, and ducks in a good game country, there is no reason why one should be condemned to live exclusively on tough old moose and elk steaks. My two pet rifles are the .32-20 for deer hunts, with its .32 S. & W. auxiliary pistol cartridge, fed direct into the high-power chamber without any supplementary cartridge at all; and the .35 high-power, shooting the .38 pistol cartridges (all except the .38 Special) in a steel auxiliary shell, fed single shot into the rifle when meat-in-the-pot has flown into a near-by spruce and is there for the taking. My revolvers for either trip take these cartridges, so there is no doubling up on ammunition. The .32 long-barrel revolver and .38 officer's model, with 7-inch barrel, have accounted for much feathered game with these auxiliary pistol cartridges when there was no time to get out either rifle or supplementary cartridge.

A last bit of equipment often overlooked is the sharpening-stone. You will not miss it much until there is a job of skinning or heavy axemanship to be done, and then you would pretty nearly give the trophy for just one lick at a good stone. The round carborundum stone, with coarse face on one side and fine on the other, carried in a leather case on your belt, is the standard rig. Then there are fine little vest-pocket stones, with the same grades of finish on either face; a little small, and apt to let you get

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cut in sharpening, maybe, but light and preferable for the man who wants as little weight hanging about his belt as possible. For me neither scheme seems ideal, and I have steered a middle course by adopting a segment cut off the round stone by a cold chisel, large for both knife and axe sharpening and this goes in the justly celebrated ditty-bag, along with a raft of other knacks and kinks like unto it. With this stone the belt-axe, hunting-knife, and pocket-knife are kept up to normal keenness, not because I like to work over them by the light of the camp-fire, after cleaning rifle and revolver and before turning in, but because I am lazy—phenomenally lazy—and no effort of mine is ever put forth except with the ultimate aim of saving yet more labor of a greater kind—in this case a sharp axe saving much cutting and many blows, while a sharp knife walks through anything you have to cut, requiring no effort at all but just guidance on your part!

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CHAPTER IX

IN EMERGENCY

THOSE of us who take the trail early and often are aware that this being left out all night, this matter of being pitted against the savage conditions of the wilderness, alone and unaided except by the equipment carried on the person, is such a frequent occurrence as to demand a certain forethought in providing an emergency-kit, both mental and material—in a word, the knowledge and wherewithal for obtaining food, shelter, and warmth from the materials at hand in the forest regardless of the time, place, or state of preparedness in which one is found. Resourcefulness—that is the slogan of this great game of living in the open. Assuming that you already have a camp and trail equipment that just suits your tastes and temperament, what can you do in the emergency, deprived of part or all of the equipment which you have brought into the woods with you? You may lose rifle, axe, or grub, or all three; you may get burned out and lose clothes and shelter. What would you do to replace them, in emergency? The following ideas are offered as

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showing the way to efficient substitutes which have been used in just such emergencies by the writer and others during our trail experiences.

FOOD

Forest conditions impose a feeding régime of two meals a day. It is the only way to get anywhere or accomplish anything, unless you expect to confine yourself to cooking, eating, and washing dishes all day, or else propose to leave off your hunting or fishing at midday and seek camp at noon for something to eat. The successful hunter ranges far and wide, and he needs the whole day to cover territory and track his game; the fisherman knows that no fish are caught on a dry line and that it takes time to get on your ground, to fish a stream properly or cast a pond thoroughly, and he must not be hampered by the necessity to return to camp at midday. Travelling by canoe or pack-and-saddle, the day's trip must be made in one lap, with at best a brief stop at noon for a bite and a smoke; even the best cook cannot prepare a cooked meal, have it eaten and the dishes washed and repacked in less than two hours, which is too much time out of the day's total.

The answer to all this is the pocket lunch, a matter too often forgotten or not properly provided for. Our stomachs have been so long accustomed to the three-meal day that the omission of the midday

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one entirely is not to be endured, except by a gradual process of getting accustomed to the change. Yet a mere bite will satisfy the craving; a sandwich and a cup of something hot, easily prepared during that noonday stop which is necessary for a rest and a break in the most arduous hunt or the most successful fishing day. The plain sandwich will do, but it is cold and indigestible, and likely to cause intestinal upsets and be half-digested unless accompanied by something hot, and this need led me to give a good deal of study to the ideal emergency ration, especially as the festive sandwich is likely to be forgotten or omitted altogether in setting out from camp. This ration should be a small package, something to go in pocket or ditty-bag; something that is in itself a cooking utensil (or two of them), and something that will contain not only enough raw material for one lunch, but for four or five or a dozen of them.

For several years I used a flat tin, 4 inches in diameter by 5/8 of an inch deep, with two tack-holes in the rim so that it could be tacked to the end of a stick or to two forks of a green branch and serve as a small frying-pan or to boil a dish of tea. This tin contained flat packages of tea, bacon, bouillon capsules, salt and Saxine sugar tablets, being closed by a hardtack which fitted in the tin like a cover. It was a little too small, though very quick to use, as

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a tiny fire would boil water in it in no time. It held just enough to fill my folding aluminum drinking-cup and I would steep a pinch of tea in it and pour the brew into the hunting-cup for drinking, doing the same thing for bouillon. For frying, a chunk of fish and a slice of bacon were all you needed for a meal, and the tin was then tacked inside of a green sassafras fork, for if put at the end of a stick it would always warp. My present kit has an emergency ration which is a pressed-tin affair 3½ inches by 3½ inches by 1½ inches deep, with rounded corners, capable of holding just half a pint of water. This boils in five minutes, with a fire made of a few dry sticks heaped together and two stouter ones for fire logs. It boils you a full cup of tea or erbswurst, and inside it there is room for a brass primer-box full of Ceylon tea, another of erbswurst-powder, another of salt, half a dozen bouillon cubes, a tiny bottle of sugar tablets (one is enough for a cup of tea), four slices of bacon and some chunks of army emergency chocolate. There is no solder whatever anywhere on this tin, and it goes in the ditty-bag as a standard institution therein. With rifle or rod, or neither, provided there is fish and game to be caught, I can keep going a long while, and often have I made myself a nourishing emergency lunch with it, sometimes with the pocket sandwich to help out, more often without.

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Total loss of the grub-sack is not likely to happen with experienced woodsmen, but it can happen and occasionally does. More often the provisions run low before the party has any idea of coming out of the woods, or guests and Indians cause unforeseen inroads into the larder and the flour-sack runs dry when you are still two or three hundred miles from anywhere. Bartering for flour with passing Indians and trappers is the usual way of replenishment, but a little knowledge of the edible and really delicious plants and nuts, used by the Indians before the days of flour, is a way out that every sportsman should know. The best vegetables that grow wild are the wild rice, the roots of the yellow and arrow-leaved water-lilies, the Indian potato (most erroneously dubbed the Jerusalem artichoke), the flour made from the various acorns, and the beefsteak mushroom. Wild rice is a most unsavory-looking dish, but much more appetizing and delicious in flavor than our white cultivated rice. It is best gathered by two men in a canoe, one paddling and the other, armed with two sticks, bending the stalks over the canoe while he thrashes out the grains with taps of the other stick. A bushel of it will fall into the bottom of the canoe in a morning's collecting—enough to take a party a good many hundred canoe miles. Ripe from September on. Boil thirty-five minutes.

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The roots, or rather bulbs, of the arrow-head water-lily are gotten by wading around in the mud in a bed of them, thereupon they float to the surface, as you may have often noticed in freeing your casting lure from these same lilies (the ones with the blue spikes of flowers). Washed and boiled, the root makes a good substitute for potato, particularly with a stew of wild flesh—rabbit, bird, squirrel, venison, elk, moose, or what-not. Another wholesome addition to the stew is the bulb of the wood-lily. Boiled in a meat stew, it takes the place of the onion of commerce. Another addition is the root of the yellow pond-lily, a thick, tuberous root gotten in two to four feet of water by dredging for it with the hands. Growing all over the Eastern woods, from Minnesota to New Brunswick, and south to the Gulf States, is the best "spud" of them all—the wild bean, or ground-nut. Look for it in wet forest meadows and swamp borders, a vine with five or seven pointed leaflets on the stem, dark purple-maroon flowers something like a clover or green pods full of nutritious little beans, and a root with lots of small tubers attached, from marble up to egg size. These boil and taste like potatoes, and where you can find wild beans never despair for a proper "mulligan," even if the "spud-sack" is down to its last occupant!

The Jerusalem artichoke, or Indian potato, occurs

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by the roadside and in forest meadows, being generally the relic of former Indian plantations, for the Indians used this root extensively as a tuber in stews, etc. It looks something like the ordinary yellow daisy or black-eyed Susan, except that the centre button is yellowish-green. The leaves are, however, broad, lance-shaped with thick leaf-ribs which at once distinguish it from the narrow-leaved daisies. It is really a wild sunflower and its root when boiled makes an excellent substitute for potato. It occurs from Pennsylvania, west to the Rockies, south to the Gulf States.

For flour, all the round-leaved oaks—white, swamp, post, black-jack, chestnut, and overcup oak—throw down incredible quantities of edible acorns. To make flour, dry the kernels in the sun or over the fire, pound to powder, and leach out the tannin by percolating through a cloth bag until the water has no yellow tinge. It is then ready for boiling, making a corn mush of it, wholesome and nourishing, albeit nothing extra as to taste. The same sort of flour can be made from chestnuts, or they can be roasted and eaten out of hand. No acorn can be eaten without first getting rid of the tannin, and the spike-leaved oaks, even the red with its great, blunt acorns, all have such acrid acorns that they are best left alone. The other oaks are, however, easy to manage and the flour is high in nutrition.

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The beefsteak mushroom, or common puffball, is familiar to us all. When old and dry it is valuable as a fire punk, as a spark caught in it will yield a hot coal and can be carried a long distance. When young and solid white inside it makes a good bread, being peeled and sliced and fried. The common mushrooms are also fine additions to any mulligan, and are recognized by their pink or brown gills and their wholesome smell. Never use a mushroom with white or yellow gills, growing out of a bulb or cup, as these are poisonous, some of them so deadly that there is no known remedy.

FIRE

Next to something to eat, is a fire to cook it. Did you ever stop to think how many of our garden vegetables would be absolutely inedible and useless unless cooked? The same thing holds with forest vegetables. Merely tasting them raw is no criterion; most of them are bitter to a degree until cooked, when the bitter ingredient disappears. To make a fire *with* matches, let alone without, seems to be beyond the abilities of many tyros who come into the woods. For a quick little lunch fire, the best thing is four stakes driven in the ground and a little inverted pine cone of slivers whittled from a dry stick, the slivers being left on the stick and the same stuck into the ground. Pile your splinters around

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this and put the frying-pan on the stakes. For a kettle or pail, use a dingle stick, an inch sapling stuck in the ground and adjusted as to height over the fire by two forked stakes. In your ditty-bag should always be several brass chains with pothooks attached, which are forthwith slung over the dingle pole and the proper height of pail adjusted by hooking the upper hook into the right link of the chain. These little chains weigh nothing and fold into the most inconspicuous corner of the ditty-bag. Two pieces of copper wire should also find place there for lashing a cross-pole to two upright stakes, in case you have several pails over the fire. Without either chains or hooks, use forked short branches with a notch in the lower end to take the bail of the pail. For the emergency-ration container you need two small inch logs side by side, with two short ones under them and a small fire of twigs built in between. For a fire on the snow, four short 3-inch logs side by side with the fire built on them. For a reflector-baker fire, two pairs of stakes driven in vertically about a foot high and four or five small logs piled in between these stakes, forming a vertical background. Pile the kindlings vertically against this, getting a high flame that will bake both sides of your biscuits or corn bread at the same time. To make a sure fire where you have only one last match, prepare a large quantity of shavings, at least a hatful,

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and strike your match in the centre of these; it will surely start.

Now for fire without matches. First your rifle or pistol: hack out the bullet, take out all the powder; put some of it in a linty rag, or some tinder, such as shredded birch or cedar bark; put the rest loose down the barrel and fire it into the tinder, holding the muzzle about a foot away. If you have only your hunting-knife, search the brook bed for a flint, and make a tinder by tearing a strip off your handkerchief; roll the torn edge into a fuzzy cylinder and work over the flint *until* you get a spark caught in the tinder—not to be caught on the first trial! And flints are not easy to find in most hunting countries.

If you have on your watch and there is sun, you'll do better to retire to some secluded sunny spot and use the watch crystal on your tinder, filled level with water to make a burning glass of it. This, however, is not practical in the spring and fall months, when the sun's declination places it well down on the horizon, as one cannot hold the glass any other way than level without spilling the water, and you therefore can get no hot point in focus. It will work at high noon in midsummer only. Your camera lens unscrewed from the plate will start you a fire in any old sun.

Without rifle or matches, the surest way to get

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a fire is with the fire-drill. This is a bow with a loose thong, a thick drill of about an inch of dry balsam, linden, cedar, or cottonwood, a foot long and rough-sided, so that the drill thong will not slip on it. A drill socket of any hardwood, with a cup in it to take the top of the drill, is next in order, and a fireboard of the same wood as the drill, with a set of notches in it, at the point of one of which you start drilling the cup. Passing the thong around the drill and bearing down hard on the socket, you saw back and forth and the drill begins to form a cup in the fire-board. Its detritus piles out into the angle of the notch onto a chip placed under the fireboard. This little pile is composed of hot, charred drill splinters and dust, and, as you work at the drill, smoke arises from the cup, and finally a spark, which tumbles out into the notch and is picked up with its pile of punk on the chip and fanned, ever so gently, until a small coal is formed. This is to be deftly transferred into your wad of cedar or birch-bark tinder and blown to a flame. Mr. Ernest Thompson Seton, the man who rescued this method for us from the domain of legend and made it a practical reality, can light a fire with the bow-drill in thirty-one seconds. I have seen him do it in less than a minute, but most of us make clumsy mistakes or get wood not exactly right for the purpose (it should be just soft enough to yield good friction

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splinters), and we make a number of bungles before getting any fire. The soul of it is speed, however. Get everything ready and then saw away like a good fellow. Any strong, flexible twine will do for the bowstring in lieu of a rawhide thong (your moccasin lacing), so that one should be forthcoming from your own clothing without much trouble, but the only vegetable bark or root I have yet proven out which will yield a thong strong enough yet flexible enough to work around the drill is the bark of mockernut hickory peeled off when the sap is in the bark, split into thin strips, and platted into a stout bast cord.

UTENSILS

Often one gets left out overnight, well-found except for a cooking utensil. If in the north country, where birch bark is to be had, it is a matter of but half an hour to make a bark bowl which will hold a quart and boil anything you want to as long as you care to keep it up. Here, also, there is a good deal in the *savoir faire*, as many glib writers mention this method without these accompanying practical cautions and directions which show the hand of the man who has actually done it. To begin with, the bark must have the rough outer coat peeled off or it will surely crack and leak when you fold up the ends. There is no time to supple it overnight, nor neces-

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sity, if only the inner folds are used. A piece a foot square is ample, got off a young tree at a spot where there are no checks or knots, for the least leak is fatal. Fold the corners and skewer them flat with a green stick and you will have a square box 2 inches deep by about 8 inches square. This is to go on two logs over a bed of glowing coals from the main fire, replenished occasionally. At that, the upper edges of the bowl will warp and curl and are better reinforced with a light green twig frame. No flame should touch the bark, because, while it is true that birch bark will not ignite with water inside of it, it is equally true that it will burn readily down to the water's edge, whereupon the least sagging will spill the soup over into your fire, putting it out. A bed of hot coals, however, will bring the water to boil in about ten minutes, and you have all the tea you want for the steeping. To make erbswurst soup you must keep it boiling about twenty minutes, and this I once did in a birch-bark bowl as above described, making an excellent, palatable soup and keeping the bowl bubbling merrily by assiduous blowing on the coals.

In a country where the canoe birch does not grow, you have recourse to the red maple, in a log of which you can cut a bowl holding a quart, with your axe and hunting-knife as the sole tools. Select a log about 8 inches thick and cut off a section, clear and

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free from knots, 2 feet long. Dap off the top flat and lay out on it a rectangle 4 by 18 inches long. Dig down with axe and knife until you have made a boat about 2 inches deep, smooth and level it and fill with water. To boil it, set some smooth quartz stones on the fire; about fifteen of them will be wanted about the size of a large hen's egg. These should get white hot, for at first they will be covered with black soot, but as they heat up this goes off and the stones are clean as ice. Pick them up with tongs and put them one at a time into the bowl. The whole thing will be boiling at the fourth stone, and after that one stone a minute will suffice to keep the thing bubbling. It takes an hour to make the bowl and you get your tea four minutes later and your soup in twenty minutes to half an hour. It will be dirtier than the birch-bark bowl soup, but palatable and nourishing. Elm bark also makes a good boat if you have balsam pitch handy to stop up the ends. Get off a section about 2 feet long and bend it at the ends into a sort of boat. Clamp these tight with pairs of sticks, flow in your pitch, and stick the clamps into the ground. Water is boiled in it with stones, as in the other boat.

WEAPONS

Occasions can arise, and sometimes do, even with cautions and experienced woodsmen, when one is

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deprived, by total loss of rifle or cartridges, or loss of some important screw in cleaning, of a weapon, and it cannot be replaced for love or money. What's to do? Are you going to give up the trip and make the best of your way back to civilization, or are you going to make an interesting experience of it and try your skill with man's ancient weapon, the bow? While javelin, sling, and club are all much more efficient than we give them any credit for, the things one can do with a good bow are incredible, unbelievable, to one who has not actually tried. Most of our bow memories are of the boyhood plaything, made out of an old stick of wood, weak, inaccurate, and furnished with an arrow which never twice takes the same trajectory. I'll admit that finding a driven arrow in the forest is an aggravating pastime—worse than untangling fly-hooks on a trout-stream—but the accuracy and strength of a man-made bow, with a straight ash arrow well feathered, has to be tried to be appreciated. A natural-oak branch with a mockernut-hickory bark thong and a feathered arrow made from a natural chestnut or maple shoot is no mean weapon, let me tell you. At the ranges at which fool-hens, grouse, and squirrels can be shot in the real wilderness, such a weapon should keep you in meat indefinitely, and there is not a part of it but that can be had from the forest with no other tools than your bare hands and a sharp

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stone. Braided rope of the bark of cedar or mockernut hickory makes better thongs than vines much more easy to get, such as greenbrier. At 25 feet you can drive your arrow into any mark 8 inches in diameter, and that early in the game of learning how to shoot, and your effective range will quickly increase. You need, first of all, plenty of power—a bow as long as yourself and of thick stock. The English longbow was 3 inches wide and an inch and a half thick at the middle. Hornbeam, oak, and ash make good raw bows; hickory must be seasoned to be worth anything, and ash must be peeled and dried over the camp-fire before it gets enough stiffness. For a makeshift I would choose a stout limb of oak already somewhat bow-shaped and taper down its thick end with knife or hatchet. Then two deep notches at the ends, and a thong of stout cord, triple-braided cedar or kingnut-hickory bark, or eelskin, in order of preference named. The loop is to be lashed on the cord with fishing line or cedar bark or greenbrier tendril, half-hitching at every turn.

Make a cuff for your left arm of leather, canvas, or birch bark, and you are ready for the really important article, the arrow. Natural arrows are made from the shoots of *Viburnum dentatum* or arrowwood, red maple, chestnut, sassafras, or small spruce limbs, peeled, straightened by hand and eye, and then hung up over a small fire to season, with a

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heavy weight at the lower end. Better arrows are split from dry pine or cedar, spruce or ash, splitting out from a 3-foot billet with the axe and finishing with the knife. If dry billets are chosen, these will already be seasoned and will stay straight, so that, once finished, you can proceed to learn the flight characteristics of each arrow forthwith. Any reasonably straight arrow will go straight for a short distance under a powerful bow—enough for small-game shooting at close range—but if you are to do some small deed upon big game at 75 to 100 yards you must know each arrow and its flight characteristics, as no two home-made ones are alike. For feathering, the dropped feather of duck, goose, hawk or even such a bird as the whiskey-john, or even made of birch bark will answer, and the vanes are lashed on at both ends, three to the shaft. The arrow-head is the hardest thing to furnish from camp supplies. The best are made from eight or ten penny nails, forged in the camp-fire; not a difficult thing to do, as an axe driven into a stump is a very fair anvil. The nail is driven into a green stick in lieu of tongs, and there is metal enough in the nail-head to flatten into a fair flat-pointed arrow-head, reversing the flat and welding over to get a barb. Such arrows should have some taper, with the heaviest end at the head, for there is not metal enough in the nail to make a good balance. The arrow is well lashed

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an inch back from the head and the point tapered down to the nail, when you have there a formidable missile that a good bow will drive clean through a deer from side to side. For small game, arrows with bone or thorn heads are effective enough and easily made, as bird and small animal bones are easily stone-ground to a point. Certain woods, notably pin-oak, hornbeam, locust, laurel, and holly, when sharpened and burned, give a hard enough arrow-head for all bird and small-game shooting. The Indians make a whole set of arrows on this order of straight cane stalks with a hardwood point and tied-on feathers, amply good and straight enough for short-range pot shooting.

Out West, where the crack of the rifle is apt to scare off big game, they use the "rubber gun" or slingshot of boyhood days, for pot shooting grouse and fool-hens. No. 2 buck is the missile and a body shot is just as effective as a head shot. A man-sized wood crotch, two rubber elastics, 5/8 inch by 5 inches, and a leather pouch are all the materials needed, and room should be found for them in your pack or on your belt.

TACKLE

While a camping party is perhaps never without tackle, it often happens that the lone hunter finds himself beside a pond teeming with fish and no hook

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to catch them with. We all like a little fish for a change, and nearly every one carries a fly or two and some spare hooks in his inside hat-band; but if totally without, one need not despair, for a hook that will land 'em is not such a mystery as it seems. A greenbrier thorn lashed to a tiny bit of wood pointing back at a sharp angle by its own tendril served our Indian fisherman for a mighty long while before the white man and his steel hook put in an appearance. A sharp-pointed bird bone or even a hardwood sliver, charred and pointed as sharp as the proverbial splinter, makes a good hook when lashed to a small stock in the same way. The whole hook is covered with an attractive bait—a lump of raw meat will do for blue-gills, perch, and catfish—and, with a ready line and a hunter keen to yank at the first nibble, the fish is out of water before he knows it. A grasshopper and a short pole will do the same thing for trout. Work the pole through the alders and skitter the grasshopper over the pool, and if there is a trout in it he strikes and is snitched out onto the bank before he can flip a fin. Not angling, but great for meat in the pot!

With a greenbrier-thorn hook you need a flexible pole and must tire out your fish on a taut line, for the thorn will not stand a stiff jerk without breaking off. I once made two hooks on this order and caught a mess of sunfish with no materials but the green-

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brier thorn on its own twig, lashed into hook form with the flexible tendrils of the vine which are about 4 inches long and strong as No. 40 cotton thread, and knot readily.

SHELTER

It depends upon the country you are in, the main object being to keep the cold radiation of space off you in clear nights and the rain or snow off in cloudy ones. No improvised shelter will turn a heavy, driving rain, but even a flimsy one is better than none at all. Wherefore, if caught out overnight do not "rough it," dozing before the fire, roasting one side at a time, but build a small lean-to or wickiup. The classic brush lean-to of balsam or cedar boughs is the thing if in the country of these trees; do not use small trees, but rather boughs, lopped from the lower trunks of large trees. These already have the flat spread so useful for roof shingling. The only small tree at all suitable for roofing is the red or white cedar, and that will by no means shed rain, as its branches do not set right for such service. In hardwood countries the best lean-to is made by shingling the lower branches of red oak, birch, beech, and soft maple, following the same lines as the balsam lean-to. In grass country a thatch roof is made by putting cross-purlins of small saplings about a foot apart up the poles of the lean-to, gather-

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ing a quantity of long grasses and bundling them with a vine or cord passing around the lean-to purlins, and taking a sheave of grasses as thick as your wrist at every turn. Three rows of these grass bundles are sufficient, overlapping a foot, and the edifice will take about two hours to build. Using the same sort of frame, I have shingled pine sprays from the pitch-pine in sandy countries with very good results, and the "niggerheads" of the long-leaf pine in the South would serve the same purpose admirably. In the tropics I have made very good lean-tos of the seaside palm-leaf. In all these shacks with a fire out in front, if you have no blanket it is far better to prepare a dry, comfortable bed than to attempt to sleep with your clothes on, only throwing in a little brush to take off the raw edge, so to speak.

It is much better, if the woods are dry, to fill the lean-to with a great pile of dry leaves or pine-needles or grasses at least 2 feet deep, occupying the hours after supper for this purpose. Bank these in two main piles, with a hollow in between, lie down in this hollow, take off your outer clothes and put them over you, depending upon your bodily heat to make the dry stuff under you warm and cosey. There is never any trouble about this if you have enough dry leaves, needles, or grass underneath; it is the upper side that gets cold. No amount of clothes if kept on will be warm enough and comfort-

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able enough to let you get to sleep. They shut off circulation and impede free movement; but it is surprising how effective even a mackinaw coat and trousers are when spread over one of a cold night, with a bed of dry stuff to lie down in. You will arise next morning refreshed and ready to find that lost trail again, whereas if you had "stuck it out" all night in your clothes before a fire, you would be just that much the worse for wear and likely to spend yet another night out before you got through.

THE DITTY-BAG

My great panacea for all emergencies is the ditty-bag. It is the first thing taken off and hung on a twig when a camp site is decided upon and the last thing put on when camp is broken. It has everything in it for repairs, accidents, emergencies of all kinds. Canoe leaking? In the ditty-bag is a small stick of canoe glue, a heavy needle, and strong thread. Moccasin stitch out? You'll find a leather needle with a thread of moccasin twine in the d.-b. Suspender button off? In that repository of repairdom is another button, a needle, and shoe thread. Sick? There is a medicine-kit in the emollient of emergencies which will cure anything you have, from fever to delirium tremens. Hurt? Right this way, we have it right here, surgical bandages, tape, stitch needle, antiseptics—can give you a

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whole new rubber neck on demand. Gun needs cleaning? The whole works are in the ditty-bag. Hungry? There are a dozen square meals lurking inside the covers of that—grab it from me—justly famous ditty-bag. Tackle frayed or lost? There are bass and trout fly-hooks, a dozen leaders, spoons, plugs, sinkers, swivels, hooks, spinners, guides, tips, and safety-pins floating at large in the confines of that capacious receptacle. Lost in the woods or in a fog on a lake? In the—well, you know—you will find a compass that will help some. Grommet pulled out of tent or tarp? We have it, a spare one or two; also nails, tacks, copper wire, and four pot-hook chains. Lost your fish-line? Never mind, in this tucket of trinkets we have 50 yards of No. 5 casting-line and 30 yards of E trout-line. 'Possum up a hollow tree? We have the exact specific for him, for here comes the crowning glory of the ditty-bag a steel 'possum hook made from a bent file, sharp as the devil, will hold a ton, good for any use to which a stout hook may be put, from gaffing a fish to lassoing a runaway canoe!

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CHAPTER X

TAKING THE FAMILY ALONG

I HAVE two angler friends, both of them mighty fishermen, both of great repute. The only blot on the fair escutcheon of one of them is that he has a tendency to revile the other for bringing along his wife, children, puppy-dog, and pussy-cat when he goes a-trouting. To me, however, that is one of the chief charms in the character of the other angler and I admire and respect his desire to share his stream-side joys with his family, even though I realize fully that it increases his personal labor and decreases his available time for wetting trout-lines. Piscator No. 1, in common with the vast majority of outdoorsmen, prefers to go it alone—to fish while he is fishing and stay home when he is staying, and not mix the two, and he usually propitiates the partner of his joys and sorrows by a notable present after each trip. He is privileged to do so—but, just the same, he is missing something.

Let me tell you a little story: some time ago a few of us formed an organization whose avowed purpose was camping out once a month every month

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of the year. We had lots of fun out of it, first and last, but each and every camp left an aching gap in the family circle when camping dates came around, and each time the juveniles became more and more clamorous to go, too. Then some one suggested that we take the kids along, and forthwith the affair was brought about—in mid-December; four daddies and six kiddies—and maybe they didn't have the time of their lives! The oldest was thirteen, youngest eight, three girls and three boys. We had a 14 by 16 wall-tent and stove, ten folding canvas camp-cots, and complete cooking outfit. The six kids cut and drove tent-pegs, helped put up the tent, cleaned out the floor of it inside, set up the cot-beds, carried water, chopped fire-wood, helped cook, did nearly all the eating, and washed up afterward. We had camp-games all evening and by eight o'clock six warm sleeping-bags held six curly heads, which *would* pop up every time the men outside around the camp-fire cracked a joke or took a drink. Finally, after awful threats, they all fell asleep, and soon we turned in also.

Next morning a wash in the lake, breaking through an inch of ice to do it, breakfast, dishes, more games, an exploring trip through the forest; and if there had been snow we were ready with snow-shoes and skates. Altogether the kids had a gorgeous time and broke camp with a howl of dismay, while the

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four daddies agreed that camping was even easier with them than without.

The ladies at home put up with all this with amused tolerance; but when, on the return, they were assailed by a crowd of excited juveniles, radiant with snapping eyes and blazing cheeks, they began to put forth hints, more or less obvious, that it wasn't just exactly the height of bliss to be left behind, either!

I think that most outdoorsmen who have observed keenly are agreed that, given the same completeness of equipment and the same real wilderness conditions, the girl is as keen a sport as the man. She enjoys the zest of the wild life as well as the man does and she will endure hardship and fatigue quite as well as he. She doesn't like tame wood-lot camping, where there is a farmhouse every mile; nor camping in old clothes; nor in a wall-tent in plain sight of a country road. But, take her along on a long canoe trip through an uninhabited region, or on a hunting and fishing trip in Maine or Canada, where the whole world is yours as far as you can see, and note how intensely she will enjoy every phase of camp and trail life, provided that you know your business of going in reasonable comfort and do not run her into the miseries and tribulations usually endured by tenderfeet.

Getting back to the kids; they are passing through

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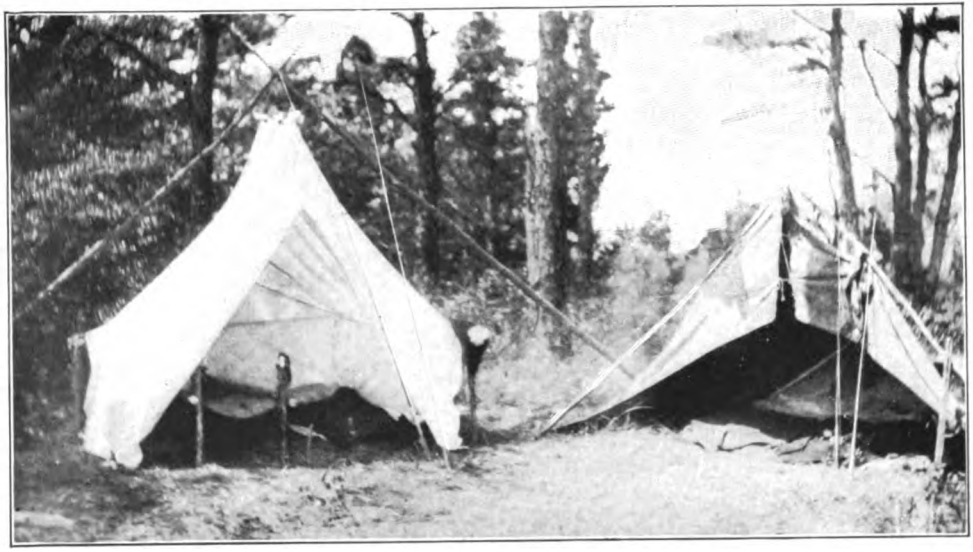

A FAMILY ENCAMPMENT FOR FIVE.
The two tents together weigh eleven pounds.

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their age of primal savagery, anyhow, and to them every detail of camping and exploration is a joy beyond all joys. Even the Glorious Fourth is tame compared to a real camp! They can go with you anywhere—fishing, camping, canoeing; in the snipe blind, the duck boat, or the up-land brush—anywhere but big-game hunting, for the hardships of which they have not the necessary endurance. Quick sales and small profits for them!

A boy of nine to twelve can carry a 12-pound pack, without tuckering out, from 6 to 10 miles, depending upon the going. He can handle a bait casting-rod quite as well as most men, usually catches the most small trout on a trout trip, and in salt-water work will take fish up to 6 pounds entirely unaided. Rifle-shooting the American boy takes naturally to. I do not approve of letting boys under twelve go afield with either the .22 or the small-bore shotgun, but a good, accurate air-rifle is safe in the hands of a reasonably steady boy of ten years and older. With such a weapon he has an incentive to go into the woods and learn the great game of woodcraft. Most outdoor boys are great naturalists and collectors, and if the thing is not overdone it should be encouraged. As the curator of a great museum once said to me, "the self-reliance, woodcraft, and love of Nature that your boyhood collecting trips taught you, far more than repaid any

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slight drain that you may have made on wild-life resources."

For the boy's equipment, in that 12 pounds of knapsack load must be found blanket, bed, pillow, tackle, extra clothes, 2 pounds of provisions, and usually a can of worms. So far as I know, there are no boys' knapsacks for sale that are anything more than toys, by no means strong enough for real trail conditions. A very good one can be made out of a canvas shell-bag, costing one dollar at the sporting-goods stores. Take the strap off this and move the leather ring tabs around to the rear upper corners of the bag. Cut up the strap to make two shoulder-straps and you have a servicable knapsack that will fit a boy of ten to twelve years. For a blanket you want something water-proof, warm enough for temperatures below freezing, not over 12 inches long by 4 inches in diameter when rolled up, and not over 3½ pounds weight. The size blanket for a boy of nine or ten would be 4 feet 6 inches long by 36 inches wide, with pins or lacings to secure it to the browse-bag. To make such a bag you will need 1½ yards of brown water-proof canvas or tent silk, 30 inches wide, and to this sew a lining of fine all-wool blanketing 36 by 54 inches, running the seam an inch inside the canvas edge, and face this lining with gray flannel with a gray tape edging around blanket and flannel. This rig weighs

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3½ pounds, is water-proof when rolled up, makes a parcel 12 inches long by 4 inches diameter, which can be secured on top of the knapsack with brown tape straps, and it is comfortable down to freezing. Provide it with a row of grommet holes along the sides and foot, so it can be laced to the browse mattress, for boys *will* wiggle around at night and will unroll any number of blankets. A bag of some sort for them! For a browse-bag, 24 inches wide by 5 feet 6 inches long is ample; top face of brown canton flannel, bottom face of brown 8-ounce canvas. It weighs 15 ounces and goes with the pocket cook-kit, tackle, bait, etc., in the pack. For a boy's clothing outfit I would prescribe: high-top, water-proof moccasins, fine, long wool stockings over his ordinary ones, drab army wool shirt, corduroy knickers, corduroy or mackinaw coat, soft felt hat, sweater, bandanna, belt, sheath-knife and belt-axe. For summer camping a khaki rig with khaki riding breeches, stockings and low mocs is best. Personally, I do not care much for summer camping, insects and neighbors being too plentiful and cheap, but it's a great time o' year for boys' camps.

For a little girl's fall, winter, and spring sleeping-bag, we got up a very successful one as follows: materials, 6 yards of brown "sateen" and four 25-cent rolls of fine Australian wool. Of these we made two quilts, sewing them together around the

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edges, leaving the top open and 2 feet of seam down one side. Then, turning this inside out to bring the seams inside, we had a light sleeping-bag for the little lady (*æt.* 7), weighing but 2 pounds and rolling into a parcel 14 by 3 inches in diameter. This, with a small feather pillow, a browse-bag, flannel nightie, toilet-kit and sweater, went into a light rubber-silk raincoat, and the whole parcel weighed 4½ pounds. For her clothing in the cold months, white wool sweater, white toque, mackinaw coat (child's size), forestry cloth, loden, or corduroy bloomers and skirt, long, fine, wool socks and high, water-proof moccasins. A pair of low camp moccasins are also desirable, and, for additional warmth to the feet, a pair of gray lumbermen's socks.

As already mentioned, the better halves of the various parties to this yarn showed more than a languid interest in being taken along next time, especially after the infectious enthusiasm of the youngsters had had time to get in its deadly work. Nothing would do but complete outfits for them also. There are no better sports afield than the outdoor girls—heaven bless 'em!—but they have to be convinced first of all, that they lose no caste by going camping, but rather acquire merit; second, that the rig in which they flourish about is really becoming; and third, that their camp sleeping accommodations will be really comfortable, not the

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FAMILY KITCHEN, EATING-FLY AND TABLE, AND SIDE-OPENING FOOD BAGS.

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kind that require them to endure misery without a whimper of protest.

Beginning with shelter, the tent must be light and easily stowed, insect-tight, snow and rain proof, roomy, and capable of taking camp-cots or stretcher beds. Of course, the closed-front type is the only one considered for ladies' use. At the same time, especially in go-light and back-pack trips, the tent weight is always an essential factor, 6 pounds being about the limit. Three tents come to mind as fulfilling these conditions—a wall-tent of the Miner's type, a canoe-tent with ridge, and the Snow tent. The two former are good, but the Snow tent (shown in our illustrations) fulfils every requirement in precisely the most logical way. In front its shape resembles an ordinary wall-tent, and this is carried back for about 30 inches, after which the ridge terminates with a double triangular plane filling the space from the ridge to the rear wall and held taut with a rear guy. It takes seven long stakes, a pair of shears, and a short club to set up this tent, and, once the stakes and shears are on hand, a very few minutes suffice to put it up. The three side stakes should stand about 3 feet above the ground when driven, and to them are tied the tent corners and mid-seam at the top and bottom of the wall. The seventh stake should be stout and stand 4 feet above the ground. To it is guyed the rear peak,

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while the shears which carry the ridge club on a bridle lean somewhat against it, thus not only stretching the tent taut, but providing three points of support against outside wind strain. The Snow tent is 6 by 6 feet floor space and weighs 6 pounds in American drilling—the three-six tent, so to speak. It is 7 feet high to the ridge, giving ample standing-room and accommodates the wife and two children, the former using a pack-sack sleeping-bag arranged as a stretcher bed, and the latter sleeping on browse-bags on a rubber floor-cloth. Let us see how this tent suits itself to your lady's use. It's light—6 pounds in drilling, three in Japanese silk; she can carry it in her pack if need be—in case you are already burdened with another tent for yourself and the boys; it's roomy; the canvas does not lean over you too soon, as in all wedge-shaped tents; and there is room for two cots or stretcher beds, with space to move about in between. Used as an open tent, the broad rear triangle reflects the heat of the camp-fire satisfactorily, and when the front is closed in you have privacy and immunity from mosquitoes. It is very quickly put up, making it a good trail and canoe trip tent, and, finally, its sides are high enough to permit the construction of all sorts of little camp comforts, such as stick racks to hang toilet and clothing pockets on, etc. You will want your madam to be as comfortable as in her own

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home, and this tent pretty nearly lets you do it, on marvellously little weight.

Next, let us consider her sleeping accommodations. Woman will not endure much discomfort from hard browse mattresses, rope beds, and the like and still keep up her nerve and enthusiasm. Some sort of a modified stick bed, a plain stretcher bed or a pack-sack sleeping-bag made up with the lacing running around the poles will give her all the comfort she wants. I show the latter made up in a Snow tent. The head end of the browse-bag has a pocket across it for insertion of a short head stick, which is tied to the side poles. The lacings across the foot take in also a foot stick, and this frame, formed of two side poles, head stick, and foot stick, is lashed to four stakes which form the legs of the bed. Other available camp-beds that come to mind are the standard stretcher beds, 72 by 36 inches, weight 3 pounds; the folding camp-cots, 6 feet 6 inches by 27 inches, weight 16 pounds, folding to a parcel 36 by 8 inches diameter; and Abercrombie's modification of the Indian stick bed. This consists of a sort of khaki and wool quilt, with pockets running across it every few inches, in each of which is a tough, springy wooden rod. It is 72 by 27 inches wide and rolls up into a parcel 8 inches in diameter, weighing 6 pounds. To make up your bed, you simply need two straight side poles and two short logs un-

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der them at the ends. Stake in place and then unroll and tie fast your stick bed, which is also a warm, comfortable mattress. A good combination to go with this is either one of the wool-and-silk quilt bags previously described or the one of gabardine and woven llama wool sold by the outfitters. Either one will weigh about 3 pounds, making her total weight for sleeping equipment with stick-bed mattress 9 pounds. In addition, you should provide wool sleeping socks, bed slippers, and wool pajamas. Women lose interest in camping if expected to sleep in their clothes.

Now as to how to clothe her: The garments must look dressy, not too conspicuous or bizarre to be worn on the train to the jumping-off place; must be rain-proof and warm and rugged enough not to worry her when the going is bad. Obviously, old clothes or home-made rigs are hardly going to fill the bill. (The bill, by the way, will not be much under $50, but when it comes to outfitting Her, you do not want anything cheap!) For summer camping you will get off rather easy—a neat, well-tailored khaki suit will stand you $10, bloomers $4.50, hat $3, high water-proof hunting-shoes $9, army drab flannel shirt $3.50. Finish her off with a silk bandanna and she will tickle your eye as a modern Diana of the woodland trail. So rigged out, she will be cool and comfortable, laugh at thunder-

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CLOTHES FOR THE OUTDOOR GIRL.

IN THE BOW OF YOUR CANOE.

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showers, can wade a brook or plough up a swamp, and, with a dollar head-net, will be serene in a country where insects and black-flies are not to be ignored.

I forgot her hands. Get her a pair of buckskin gloves with cuffs, price $1.75. If the nights are cold —and they generally are in any country worth cruising in—add a mackinaw coat. Red-and-black plaid is the popular women's color; and get the real goods, costing around $15, in all wool, not the shoddy imitation which the department stores will sell you for a couple of dollars. This coat is quite rain-proof, light to carry, warm under all conditions, and is the thing for her to slip on when the chill night breezes keep you standing around the camp-fire.

For spring, fall, and winter camping she will want tweed, forestry cloth, or loden garments and thick wool socks inside the high hunting-shoes. The modern divided skirt is no shocking affair; it looks like the ordinary skirt with a double row of buttons fore and aft, and it is essential to manœuvring in and out of canoes, over rough portages and mountain trails. The coat is in the Norfolk jacket style, tailored to fit her figure smartly. The two will stand you a good stack of iron dollars, but she will look right and feel right, which conditions a woman prefers above much game and many fish.

On top of her crown of sunset hair (the novelist's

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favorite material for his heroine's wig) you put a floppy hat. Get it in mackinaw for cold weather, and with a saucy cockade and a black tassel on the side; the same thing in corduroy for summer. For midwinter a wool toque or hood is better—something that will keep her ears warm.

After she gets all this outfit, her one idea will be to preserve it immaculate from the merciless elements. Under no considerations will she daub those lovely yellow boots with that horrid water-proofing grease, and she will run for shelter at the first drop of rain, just as if she were wearing the gauzy butterfly wings of civilization. Woman, lovely woman, has—alas!—none of man's liking for worn, dirty, and blood-clotted trail clothes, and, what is worse, she will proceed to reform *you* the moment she is outfitted herself; and all your beloved and picturesquely dirty clothes are sent to the wash forthwith—to their utter ruination.

However, a few trips by trail and canoe will take the raw edge off all that; the angel becomes more tolerant and broad-minded, and you will find her the best camp-mate you ever took along.

As to the kind of trip to take, I believe a good down-stream canoe trip appeals more to the outdoor girl than anything else. She will do thirty or forty miles of river a day and will enter every bit of rough water with squeals of delight. Do not rush her

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along too fast; stop to fish or hunt or loaf when you hit a particularly pretty camp site. Choose a really wild river—one with no farms along its banks. Maine, Canada, the Lake States and the Southland are full of good rivers and lake chains. Take the family along. They will have the time of their lives, and you will work twice as hard as you usually do, but it is worth it for the pleasure it gives to others.

A go-light outfit is the ideal. It is not to be expected that women and children can pack any more than their own sleeping-outfit and personal effects. The weight they can carry on trail and portage will be: for the madam, 22 pounds; boy, 10 to 12 pounds; little girl, 6 pounds. The 22 pounds for the lady would comprise her sleeping and personal kit, besides a light tent for herself and the little girl. Your own kit would run somewhere about 35 pounds and would cover sleeping rig, cook-kit, tackle, tent, axe, rifle, and ammunition. All this you take with you en route as hand-baggage, and beware of intrusting it to the tender mercies of the baggage-smasher and the express companies, for the way these gentry rip off pack straps and tump-bag handles is a crime, no less! The food bags, baker, and grate you can check, also suitcases containing the wilderness garb, which you exchange for your store clothes at the jumping-off place.

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On the portage your guide looks after the food-bags, and you, with your pack-sack on your back, can take one end of the canoe while the rest carry their personal effects, making the portage in one lap. So organized, you and the family can take almost any trip, but beware of loading up heavy; right there is where your troubles will begin.

And bestir yourself to make things comfortable for them. A camp eating-table is to be had by driving four stakes, tying on two cross-pieces, and filling in with four 3-inch logs 5 feet long laid side by side. Top and level off with gravel from the brook. Nail up a cross-rail and hang up the food-pack, or else swing the bags in pairs over the rail.

Have a systematic set of jobs for the family on making camp. The boys will be cutting stakes while the little girl rustles browse and the madam unpacks the various packs and gets out the tents and sleeping-kits. Meanwhile you are cutting a supply of poles. Next, the stakes are driven for the ladies' tent, the bridle and club put on, the shears tied together, and up she goes! Poles 10 feet long are ample, coming down close alongside the tent and leaning slightly forward. Next goes up your own tent, and the boy will be filling your browse-bag while you set about getting supper. Two stakes and a cross-pole tied to them, chain pothooks, and three

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pails full of water lay the foundation for supper. While they are coming to a boil, rig up your kitchen, get out the frying-pan, grate, and the baker, and start the madam on biscuits. We'll have rice, tea, fried black bass, stewed apricots, and hot biscuits. Keep the children away from the camp-fire or they will kick dirt and sand into everything, for they are full of high spirits and excitement and cannot exactly be described as quiet.

Supper over, while they are washing dishes (have on a pail of water during supper for this very purpose) you light your pipe and set about making the stretcher bed for the madam. That finished, see that the little girl has browse enough and then look over your own layout. If the tents need trenching, now is the time to do it; after which you are free to join the group around the camp-fire.

Early to bed is the rule in well-regulated camps, and by nine o'clock all hands ought to have turned in. See that every one is comfortable, and, if not, insist on the defect being remedied, for it is utter folly to endure a night of discomfort when you should be sleeping soundly. Finally, throw a tarp over the food-bags, take a nip, and turn in yourself.

And do not camp just for the sake of camping. There must be an objective—bass, trout, a canoe trip, feathered game, or general hunting. Camping is hard work if you do it right. It is the most health-

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ful occupation in the world and your bodily efficiency rises to 100 per cent; but there must be some object to it all—some keen, good sport that repays for all your labor.

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CHAPTER XI

WESTERN CAMPING

SOONER or later the Eastern sportsman takes the bit in his teeth and goes on a big-game trip in the Rockies. Elk, sheep, goat, and grizzly bear are to be hunted in those mountains and cannot under any circumstances be had east of the main chain; after one has gotten his moose and his caribou, maybe a black bear and a wild hog, his Eastern big-game list is done, assuming that you already have your deer. On the score of expense the Western trip need not prove so very much more of a proposition than one to the far Canadian wilds, where moose abound, and it's a new and entirely different country, alone worth the visit to camp in it; a country of big mountains and big distances, where, to get into the heart of the game districts, one must travel from 50 to a 100 miles in from the nearest railroad. The Eastern hunter finds it different from what he has been accustomed to; not that the wilderness is essentially different but that the means of transportation and the corresponding equipment are different, necessitating different clothing, more adequately suited to the needs of the country.

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These few lines are penned to give a sketch of what an Eastern hunter going into the Rockies for the first time will have to take with him both as to physical and mental equipment.

For main travel, instead of the canoe we have the horse. That means a whole lot that one has to know or pick up as fast as may be, for often you and your horse will be entirely on your own resources; yet you are comparative strangers, so to speak—in point of fact, you may not know how to even ride him faster than a walk! Unless your guide is to do everything for you, almost breathe for you, it is essential to know how to pick your own animal out of the corral or to apprehend him if pasturing in a mountain meadow, how to bridle and saddle him, what you can and cannot take on and about your saddle, how to mount and ride him, and, above all, about a thousand things that you can *not* do on or around a horse. For it is a willy-witted beast, whose principal motive in life is Fear, this emotion governing everything he thinks and does. He has no confidence in strangers, goes wild at the mere sight of your camera flashing in the sunlight over his head, shies all over the lot when you draw your rifle—let alone attempt to fire it (which action would probably land you over the moon)—and the scent of a grizzly track two days old crossing your trail will send him into fits. So much for

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TYPICAL WESTERN PONIES, SADDLE ACCOUTREMENTS, AND RIDING-CLOTHES FOR MAN AND GIRL.

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your saddle-horse; your pack-horse is another born lunatic, perverse and pig-headed, full of original meanness, understanding no language outside of vigorous expletive, and you must know how to pack him, drive him, hobble him, catch him every morning, and extricate him from a thousand difficulties and misdemeanors into which he is always thrusting his foolish head.

Getting back to the saddle-horse, for that is where you begin as soon as your city duds are packed and you show up with your war togs on: At first your guide will rope him for you, but he will appreciate your showing some class and cutting out your own animal as soon as you get to know the game. The bunch of cayuses is in the corral, quietly switching flies. You enter, not forgetting to put up the bars again, and they will at once herd over to one side, with your particular animal buried deepest in the crowd. Now, if you want to start a riot among those horses, just go at them with the lariat whirling around your head the way you've seen it done in Wild West shows. Not that way at all, Genevieve! The pitch is the thing, not the throw. Get out a large loop behind you 10 or 12 feet long and 5 wide, grasping the loop and rope together about a yard along the rope beyond the ring. As you approach the bunch in the corner, crowd them along the fence, when they will all break and run by you in a string

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past the fence, going at full speed. Docile, nice horsies—want to work so bad that it's all they can do to keep from running under your noose—*Aber nicht!* Now is your chance, a good one at your animal's neck, which is likely showing over the rump of the next one ahead. You run forward, getting momentum for your toss, and pitch the loop straight ahead of you, aiming high, and, if successful, will get him around the neck. Brace and bring him up all standing. Talk to him as you come up along the rope. Calm him down and then lead him with you out of the corral. It is wonderful, the effect of the tones of the human voice upon a horse. He is used to being damned off his feet by some great, unfeeling brute of a cow-man, and he understands no other tones; so hand it to him strong, as if there was nothing to it but to come along and be bridled. Tie to hitching rail. Take the bit in your hand and put it in his mouth. The chances are he will set his teeth and laugh at you, but grip the gums of his lower jaw over his teeth and press down and he'll have to open his mouth. Then you slip in the bit and secure the bridle with the strap back of his ears. Be sure that this strap brings the bit up above the last teeth or he will get a grip on it with his teeth and you can do nothing with him. Take off halter and tie bridle-reins around hitching rail in a double hitch.

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Now comes the saddle. Hang the off stirrup up on the pommel and throw the saddle on his back, first adjusting the saddle-blanket, which should come well forward on the neck, as there is where it is apt to chafe. The cinch-ring is now dangling free on the off side, and you reach under his belly and get three turns of the cinch-strap through it and the saddle-ring on the near side. Take up on these turns, beginning with the innermost one, and cinch up hard. You can hardly get it too tight, for he will puff himself full of wind anyhow, so that it will be loose when he is breathing normally again. Test it by trying your hand under the cinch-strap after a few moments. It should go under with great difficulty.

All beginners mount so poorly that they put a heavy side drag on the saddle, often pulling the whole works over if the cinch-strap is at all loose. To secure the cinch-strap after all is tight, take two or three turns of the end of it around the standing loops and finish with a slip-knot in your second half-hitch. Never pull through, as the slip-knot is the favorite tie of all straps and thongs about a horse so that they can quickly be gotten loose again in emergency. Lift the off stirrup from the pommel and let it hang, and the horse is ready for you. The next thing is what to put on him in the way of duffel. Always approach your horse on the near

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(left) side and say something to him as you step up. Sling your rifle in its scabbard on the near side by the thongs which you will find for that purpose on the saddle. If you have an Eastern canvas rifle case, it will answer by tying the thongs around the tang outside the case and around the barrel forward. Never tie through the carrying strap, as the latter is apt to jolt off from the constant pull of the rifle's weight, letting one end of the rifle dangle under your horse's hoofs, scaring him to death, and he will most probably bolt. A Western rifle scabbard is the thing, as the canvas case is far too slow to unlimber when a game chance comes your way on the mountain trail—as it always is doing.

To the right, under your pommel, is the place for your camera case. The leather 3-A case with a pommel-strap riveted to it is convenient—any rig that will permit taking the camera out of the case when wanted, leaving the case in place on the saddle, secured by the off side front thongs, with a hold over the pommel. As the horse can easily see what is going on on his back without turning his head, be careful about flourishing that shiny camera about, and the less bright work on it the better. And if he will stand for your carrying a rifle on his back at all it will be across your lap, never out over his head or ears—most of them are skittish about anything around their ears, and if you want to get them

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THROWING THE DIAMOND HITCH ON A PACKHORSE.

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going wild just flap your sombrero over said aural appendices and sit tight!

In the cantle-thongs goes your slicker, with anything you want to carry rolled up inside of it. This may include a mackinaw and package of grub or fishing-tackle, but not much more, for you are limited as to the *height* of that package on behind for the excellent reason that one cannot throw one's leg over it in mounting if much more than about 6 inches in height. Finally, before mounting, see that you have no weighty and bulky articles about you in pockets or slung about your shoulders, for they will be sure to bounce out or loose or else dig a hole through your clothes. Also be sure that what you *do* need is not forgotten—pipe, matches, tobacco, watch, compass, binoculars, knife, revolver, and cartridges. All these will be wanted at one time or another, also any maps used on the route; and the place for them is stowed about you, not in the pockets of your clothing in the slicker roll, nor yet in the pack under the tarp on the pack-horse's back. For no one is going to stop the caravan to let you dig up these essentials once on the march. Chances at small game of all kinds are frequent along these mountain trails, and a good, accurate revolver and proficiency in its use are mighty valuable assets.

You are now ready to mount. Approach your horse on the left or near side—always; pass the

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bridle-reins over his head and then turn the stirrup facing forward and put your foot in it at once, grabbing pommel and cantle and swinging up on his back. In the act of mounting most horses go forward so that you will swing into them instead of away from them if you take the trouble to turn the stirrup forward. In swinging up try to get a good spring with your left foot so as not to drag your weight on the saddle. A good horseman hardly needs the pommel except to guide himself, so well does he spring into the saddle. Once up, the first thing to try is the stirrup length. There is no use in enduring the discomfort of stirrups that do not fit, for if too long you will soon be cut in two and if too short the pain in your knees will shortly become intolerable. The stirrups are adjusted by thongs in the strap, cross-laced through holes which are punched in pairs through the straps. Unlace and lower or raise as needed, being sure that both stirrup lengths are the same, for nothing is more annoying than stirrups of uneven length, tending as they do to topple one sideways out of the saddle on the long side. Your stirrups will probably be the standard iron affairs, and the best position for your feet is with the tap of the shoe well in the stirrup but not as far back as the instep, so that in case of a bad shy or fall of your horse you can easily step out. If you are wearing mountain shoes or shoepacks with

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screw calks in the soles they will soon take a position in the stirrup and stay there; if trying to use the Eastern moccasins, either high or low, the oil in them makes them slip through to the instep before the horse has gone ten feet and much misery will be yours.

In riding, if a novice, come up on your stirrups and aim to ease down into the saddle at every other bump of the horse (his gait gives just twice as many bumps as you can reasonably handle). When walking there is not so much for you to do but to keep him going with a clout over the neck now and then with the ends of the reins, and also to keep him from acquiring the bad habit of stopping to nibble a bit of grass or a tempting weed every few minutes. If you let him do this a few times he concludes that you are easy and will impose on you to the limit, with the result that you will be constantly falling behind the pack-train. In galloping you want a forward thrust to the stirrups; the motion is easy, in long leaps or bounds, and you let yourself go with him, being careful not to lean too much forward or the pommel will soon get into an argument with your vest that may pull you forward over his head. In general, try to sit easy, with loose body and arms; it is the unnecessary rigidity that all beginners assume that causes them so much pounding and subsequent soreness. Watch an Indian gal-

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loping along, 30 miles in a morning, as free and loose in every muscle as if he were just flopping on the horse's saddle; yet he can keep it up mile after mile and neither horse nor man get tired. It is the pounding of a rigid rider that makes a horse mad—that and his total lack of confidence in you as his rider and his alleged master.

You will find that considerable proficiency as a rider will be demanded of you almost the first day out. The pack-animals are always getting out of line, off the trail, and mixed up in the timber, and all hands will have to aid in driving them back again. In such cases a touch of the spur or a thrash of your reins puts your horse into full speed and your job as outrider rounding up the perverse cayuses begins. Then, for one reason or another—prairie-chicken, a duck pond to investigate or a change to make in your appurtenances—you become separated from the main pack-train for considerable stretches of time, and you and your horse are all alone, with no guide or horse wrangler to help you out in case you get into difficulties. Here are several things to keep in mind, the principal of which is never to let your horse get out of hand. They are foolish enough when you are on them and, if starting in to gallop, may get excited and turn the affair into a genuine bolt; so it is well to check up before he gets out of hand. But, dismounted, your horse becomes as

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cunning as Satan himself. He will nibble quietly enough so long as you have his reins or do not attempt to regain them; but, once *he* has them, he knows enough not to let you get hold of them again. The beginner in such cases is apt to rush at the horse and try to catch him by his sprinting speed. As well try to catch the wind! Work up to him casually and regain the reins if you can, but it is much better on a stalk with a comparatively strange horse to tie him up somewhere. And, in doing this, be sure that it is in no place where he can hang himself or get tangled up in the reins while you are off on the stalk.

A favorite trick of his is to step into his bridle-reins when allowed to graze near you and then most obstinately to stand firmly on one pin while you try to get him to raise it. A sharp blow back of the fetlock is the only thing. If, in remounting, you are clumsy and pull the whole saddle over, get his reins and stop him as quickly as possible, tie him up, and then take off the whole thing, readjust the saddle-blanket, and retighten the cinch-strap. No makeshift pushing it back will do, for the blanket is sure to have a crease in it or to be out of place, with the resulting saddle chafing. In riding through timber your horse is always either sending you too near a tree or else he goes between two of them so that one of them is sure to take off your knee. Re-

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member that a push with your hand on the tree will always shove the horse far enough over to one side to let your leg pass, and if done quickly enough you can even work him through two trees without either barking your leg.

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CHAPTER XII

THE LONE JACK DIAMOND HITCH, TENTS, AND CLOTHING

IN riding your saddle-horse and leading your pack-horse, a new variety of experiences is in store. The halter of the led horse should not be less than 8 feet long, with a knot in the end of it. Never carry it in any form of hitch or knot around your hand or fasten it to your pommel. The best scheme is to carry it in a loose loop with standing and running strands grasped in your hands. Then, if the led horse balks or stops for any reason, the loop slips through your hand, giving you time to check your saddle-horse without losing your grip on the halter. I once nearly had my hand torn off by getting a hitch in the halter around my fingers. We were working through down timber, and "Injun," my pack-horse, persisted in balking at every tree across the trail over which we jumped. As a rule the loop in the halter would slip through, giving me time to stop my saddle-horse, "Blaze." At about the hundredth time, however, the rope, instead of slipping, twisted a half-hitch over my fingers, and

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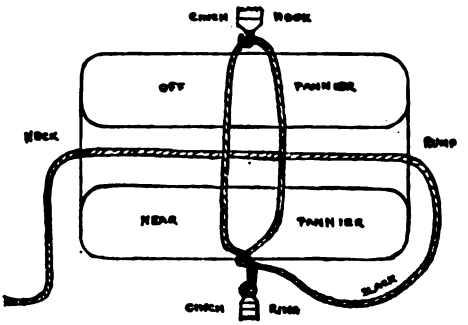
the next instant I was hung up between the two horses, with Injun showing his teeth and backing like a fiend on one side of a down tree and Blaze going ahead full speed, on the other side. I let out a cuss that they heard clear to the Woolworth Build-



LONE JACK HITCH, FIG. 1

Throw lengthwise of pack, gather up into a loop, give it a twist, throw across pack, and catch in cinch-ring.

ing, in Broadway, and just checked Blaze in time to save being unseated. It put my hand so far to the bad that Injun had to be tied to the tail of another pack-horse, and it was six months before the first and little fingers could be flexed even moderately. At present writing they are still stiff.

Coming to the pack-cayuses, a party of four hunters can subsist for a month with what provisions and duffel they can carry between them, each leading a pack-horse. The animal carries a pack-saddle, an affair looking like a sawbuck with its short legs se-

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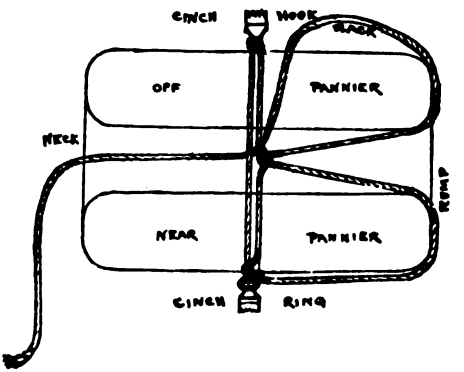
cured by thongs to flat wooden plates shaped to fit the contours of a horse's back. Under this goes a pack-pad made of felt and cloth, about an inch thick, and it has a cinch-strap, also breast and



LONE JACK HITCH, FIG. 2

Tighten loop hard, carry slack around rear corner of near pannier, pull out bight between ropes of cross-loop and pass around rear corner of off pannier.

breeching straps, all designed so as to take the load weight either up or down hill, or sideways in case the cayuse falls over or lies down, both of which some of them manage to do in plain sight of the whole disgusted pack-train. As a rule, the horse-wranglers of a large outfit take care of all the cayuse work, but if you go in a small party or without guides, having a few mountain men along as companions, you will be expected to do your share of the packing. Assuming that the horse expert of the party has put

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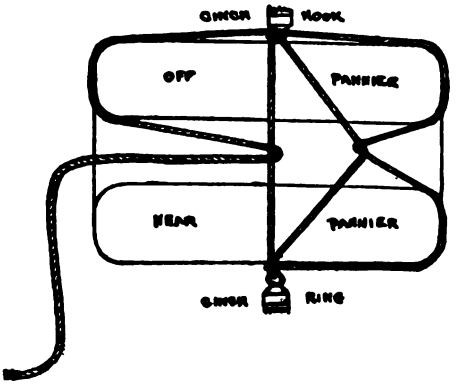
on the pack-saddle for you and tied him to a tree, it is up to you to report him ready for the trail. Across the top of the "tree," as the sawbuck part of the saddle is called, you will find the sling ropes



LONE JACK HITCH, FIG. 3

Brace foot against horse's flank and spread rear half of diamond. Pass slack around off pannier.

which are to go around your panniers and whatever load you put on the tree. Unwind these ropes and let hang on each side of the horse. Pick up the near pannier and hang it over the tree by its leather loop strap. Same with the off pannier. Next, take a turn of the sling rope on each side around the pannier outside, up over the forward tree, and down under, behind the pannier. Come up underneath the pannier with it, cinch tight, taking part of the pannier's weight off its straps, and then secure with

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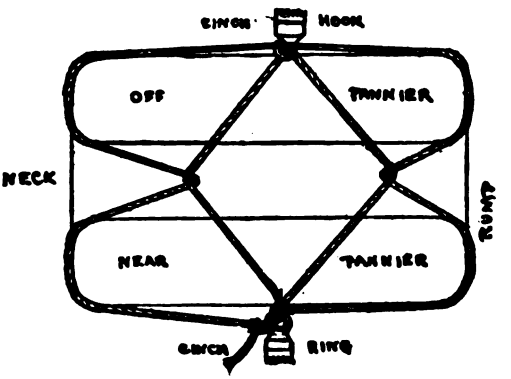
a loop-knot around the sling rope where crossed in front of the pannier. Do the same with the off pannier. Now you are ready for some long packages, say, a couple of duffel-bags on top of each pannier,



LONE JACK HITCH, FIG. 4

Keeping slack tight, go under horse's neck, grab end of rope, brace against horse, and stretch forward half of diamond. Pass slack around front corner of near pannier and finish by securing in cinch-ring.

making a nearly level surface across the top of the tree and giving you a foundation for your bulkiest parcel. This may be the big tent, your bed roll, the tent-stove or the Dutch oven—any large parcel that must be centred over the horse's back. This completes the load and the total should not exceed 120 pounds for the mountains and 150 for the plains. Test the load for balance by shaking it gently; it should balance nicely and show no tendency to work over to one side, otherwise take off and read-

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just the weights to make a balance. You are now ready for the sling ropes again.

Throw each one of them across the pack, pass through the loop previously made in the sling rope on the back of each pannier, and cinch tight, coming up hard on the rope ends and securing with a slip-knot. Test the load for balance again. If O. K., throw the tarp over the pack and get out your hitch rope. We used the government diamond, the squaw hitch and the Lone Jack, the latter most of the time, because one man can sling it, whereas the government diamond is better done with two men. If you are working at your horse alone, with all the others busy at their pack-animals and all expected to be ready at the call, "Over the river!" better use the Lone Jack hitch. Lay the cinch-strap under your horse with the hook on the far side and well in under him to allow for coming out again when you pull up the diamond loop. Stand at the near shoulder of your horse, leave about a yard of the end of the hitch rope on the ground at your feet and throw the rest of it lengthwise of the pack, letting the bight fall on the near side. Gather this residue up, make a long loop of it, and throw it across the pack to the far side. Reach under the horse and hook this loop in the cinch-hook. Take up your slack around the near hind corner of the pannier and cinch up on your loop, "giving her

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both barrels," as the mountain men say, for upon the tightness of that loop depends the staying quality of your future diamond.

You will note that when this loop went over the pack it crossed also over the length that you originally threw lengthwise of the pack. Pull out a loop of this length between your two cross-ropes, go around on the far side of your horse, grab this loop, and pass it around the far hind corner of your pannier. Put your foot on the horse's flank and pull like the devil on this rope, thus spreading the rear cross-rope out backward to form the hinder half of your diamond. Pass the slack around the bottom of the far pannier, pass up around the front corner, dive under the horse's neck, still holding tight to that rope, grab the other end of it (which is the end of the original length of rope that you threw lengthwise of the pack when you began), pull out all slack, and then get a good brace and pull for all you are worth on it, standing at the original position in which you began, viz., the near shoulder of the horse. This last heave will pull out the front cross-rope to form the front half of your diamond. Holding fast to it, so as to let no slack get in, pass it around the front near corner of your near pannier and tie it finally in the cinch-ring. The hitch is now done, and it is a good one, provided that you let no slack get in and that you put plenty of beef into it. "Cinch up till he grunts" is a good old

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rule. I taught this hitch to a Mexican war correspondent in the *Field and Stream* office in ten minutes, using a blanket roll for the "horse" (with books for his legs) and a camp-pillow for the pack. The cinch-hook was made of a manuscript hook, and some tump-line did duty for the hitch rope. Never did I see a more enthusiastic man than that correspondent after he had learnt that hitch, for his Indian packers had always imposed on him, because they knew he couldn't pack a horse himself. Perhaps the accompanying illustrations will help some brother to learn the Lone Jack hitch at home.

In general, Western camping differs from Eastern because the horse transportation permits taking a big tent along and a stove to go in it, and it is the right tent, because in Montana, Alberta, British Columbia, and Alaska, the opening of the big-game season generally coincides with the first snows, which are always heavy, a foot to 2 feet deep. In Wyoming, Idaho, and Washington the season opens September 1, so that you have little snow to contend with and open-tent camps are all right; but even there the main camp is best a wall-tent or Sibley, with a few spike tents for outlying camps. The main camp must have lots of rope, 20 or 30 pounds of it, for making temporary corrals, rescuing horses, etc., a full set of bells and hobbles, a shoeing set, a full-grown axe, and an oven of some sort for

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making fresh bread, all of which total up beyond the limits of any back-pack trip. Your go-light equipment will be just right for outlying camps and trips of a few days away from the main camp after special game chances; so do not hesitate about taking it along, but do not insist at the same time that the mountain man's rig be left behind, for yours has very definite limitations in that country. Clothing requires some modification from standard Eastern practice. You have rain, cloud, snow, ice, sunshine, and intolerable heat to contend with in alternate streaks, and the wind is blowing hard all the time. The Eastern mackinaw is apt to be chilly, as the wind gets through its weave. The Western men pin their faith to a good vest, which is left open until the cold bites in at high points on the trail, when it is buttoned up. If more protection is required they have recourse to the sheep-fleece-lined leather greatjacket, with a high collar, carried on the cantle wrapped up in the oilskin slicker, which is often trotted out for the frequent showers which occur in the mountains. A good combination for warmth and lightness is a sweater-coat of fine, light wool, backed up with a thin rubber rain-jacket, which latter can be carried in your coat pocket. This with a warm, wool vest will take care of nearly all temperature changes. Do not bring out any chaps, spurs, cowboy boots, or any horse

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specialities except a good pair of riding-gloves with a pair of wool finger mitts for cold-weather riding, also a Western wide-rimmed felt hat; it cannot be beaten for conditions in that country. And do not leave behind your belt-axe under the impression that the main camp-axe will be all that is needful. A belt-axe strapped to your coat is one of the few things you positively must have when starting out for the day's hunt in that country, for you may not get back that day at all.

Good wool night socks and a warm sleeping-bag will be wanted, also at least four pair of day socks and two changes of wool underclothing and two pair of pants. You will be out in the snow all day long and come home wet through at night, when, at the first spare moment, you take the freezing, soaking things off and change into warm, dry trousers, drawers, and socks. A pair of low camp mocs, made of thick "moosehide" so that you can step out in the snowy paths about the tent without their soaking through (as all the buckskin ones do), is the answer to footgear about camp. Under a spruce-tree near the tent is usually a drying fire; as soon as your share of wood-chopping, cooking, or helping about camp is done wring the water out of those wet clothes which you are to wear next day and string them around the drying fire. It is quite an art to get these things dry without scorching or ruining them,

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and the secret of it is to take your time and not get too ambitious about hanging things too near the fire. Next, your boots want a good dubbing all over with boot grease or elk fat, after which they are set aside on the wood-pile, not too near the stove, so that they will gradually dry instead of freezing stiff as they are sure to do anywhere else. After supper the dry and near-dry clothes are brought inside the main tent and hung up on the clothes-line which goes along under the ridge-pole. Next, you have rifle and revolver to dry and clean. Snow will have gotten into the action of both and then turned to water, and they want wiping down and oiling in addition to the regulation cleaning of the barrel. By the way, one of the best cleaning solutions for modern cartridge residue in the barrel is plain, strong ammonia, followed up with oiled rags. Rags soaked in strong ammonia will come out black with dirt after you think that the rifle is thoroughly cleaned with the usual oils and solvents.

Last thing of all: going to bed. In order to get room for eating and daily occupations in the tent, Western camp regulations contemplate every man rolling up his bed roll or sleeping-bag as soon as he is dressed in the morning, whereupon they are piled in a corner of the tent, giving room to manœuvre about in the rest of it during the day. Each man has his allotted place at night, and when the carbide

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lamp begins to make signs that its charge is approaching exhaustion and the pipes have all been smoked and the stories told, each one digs out his bed roll and spreads it in his particular corner. It will be cold enough by midnight, even with a first-class sleeping-bag, to require that you keep on some of your clothes at night. I have usually been comfortable in that country sleeping in my underclothes with wool sleeping-socks and wool slippers on my feet inside the bag, wool pajamas, a sleeping-cap, and, on very cold nights, a soft, fine wool sweater added. I throw my coat over the whole works and find a small breathing-hole somewhere through its folds. You will chill down quickly in that bitter night cold if you breathe the frosty air direct without any covering of any kind over your head.

The above sketch may give you some idea of the conditions obtaining. If you go prepared to meet them you will have a fine, comfortable experience with no hard-luck tales and no life-and-death thrillers to relate. If you disregard them, by that much will Misery camp on your trail!

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CHAPTER XIII

GETTING ON YOUR FEET

ALMOST every line of human endeavor has its tale of uplift, of getting on one's feet; but I have yet to see any article devoted exclusively to the aspects of the subject as they appear in the outdoor world. Yet, by camp and trail, one is on one's feet most of the time, and unless these pedal extensions are properly housed, their owner is in for considerable misery. The main trouble is, however, a tendency to overdo it—to house one's feet so thoroughly and strongly that 3 or 4 pounds of hobnails and leather are to be waved about all day long at the end of the unfortunate owner's legs, the while said owner suffers unceasingly from chronic tired feeling. Aside from out-and-out mountain country, I have yet to see the country that is too rough for the high cowhide or moosehide moccasin—"larrigans," as they are called in the north. But don't mistake me; this is purely an opinion based on personal experience. A bigger and heavier man would no doubt find the cruiser moccasin or the hunter's boot more serviceable in the same country. I only confess to 127 pounds of muscle and bone

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strung along 5 feet 8 of stature, and I can jump and land on a ledge of rock in moccasins and stick there, whereas the same stunt in a heavier man would undoubtedly strain or break his ankle. In general, light, wiry men will take naturally to moccasins—not the thin buckskin ones that leak in a heavy dew, but the single or double sole "moosehide" product, water-proof and big enough to allow one or two thicknesses of gray lumbermen's socks to intervene and soften the shock and pressure of climbing, running, and walking in rough country. Such a pair of mocs will weigh 24 ounces—12 ounces to the foot—will stand 8 inches high, and be water-proof to their tops, for there is a soft leather bellows tongue inside, sewed tight to the tops and vamp. They lace up with rawhide thongs, and the uppers are usually of heavy deerskin, oil-tanned. Single or double sole—take your choice. With them you can run over windfalls, along down trees, up steep rock escarpments, down rocky streams, and across muddy bogs with equal facility, and you will be dancing a jig by nightfall, when the man with heavy boots can only sit on a log and blink at you. Mocs of this kind are good for still-hunting trips, for long canoe trips where there is wooded country on the banks to be hunted, and for forest cruising on snowshoes. They are *not* good for hunting in rough, mountainous country with little timber, nor for a

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canoe trip devoted exclusively to fishing and water travel, nor for salt-marsh gunning and salt-water canoeing. In snowy weather the high moc comes into its own again. You cannot beat it for snow-shoe gear—two pair of fine, all-wool knitted socks and one of gray lumbermen's socks inside the moc-casins, and outside of them the snow-shoe thongs. Another warm moc for snow wear grows ready to order on caribou and moose. They are called "shanks" in the north country and are made of the gambrel-joint skin of the hind legs of the animals in question, and a pair of them grows on every caribou you shoot. They are worn over socks, with the hair side out. So far as I know, the only way to own a pair is to shoot one or else obtain them by barter with the aborigines.

The low moccasin of thick moosehide or cowhide is the real moccasin as distinguished from the lar-rigan, or top moccasin. This moc is laced by a thong passing completely around it, being rove through slits along the top and crossing over the tongue in a loop and a bow-knot. Pulling taut on the thong cinches the moc tight to your foot all around. For a canoe trip, where you do not expect much inland tramping outside of portages, I do not know of a more comfortable footgear than the low, water-proof moc and a pair of wool socks coming up and folding over the cuff of your khaki or moleskin breeches.

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And for mountain work, where you tramp all day in heavy, laced boots, this moc is a welcome relief to wear around camp; and, when staying in to skin out trophies or putter about camp, they are the acme of solid comfort.

All these thick-hide mocs will require occasional water-proofing and repairing, also rubbing down with neat's-foot oil to keep the leather supple. The water-proof greases require to be slightly warmed to enable you to daub them on the seams, and the oils need plenty of elbow grease and generosity in rubbing them in. At ordinary temperatures they stick on in the form of an impervious gum, and a good dose of grease in seams and stitches will make your mocs water-proof for a considerable time of complete immersion. As you wear them for several hard hunting trips your mocs will develop broken stitches here and there, particularly around the vamp at the toe and the "T" heel joint. For repairs you will require an awl, two blunt leather needles, and two waxed lengths of shoe twine. Clean out the old stitch-holes back to where the twine is sound and start your repair seam a couple of stitches back, using both needles stitched opposite and cinched as taut as they will go, finishing with a hard knot. Along about the second season your mocs will develop a new disease. The threads will stretch from long use, allowing the seam to bird-mouth open when

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you flatten them to go in your pack. By the same token they will leak all along the seam, even in a damp meadow. To have them resewn by the maker will cost almost as much as a new pair, but if you send them to your little dago shoemaker around the corner all will be well for a "price-a fifta-da cents," and you may get another season's wear out of them. Or, if you have the time and ambition, you can resew them yourself in a day's work, using two needles and following the original stitch-holes.

The hunting-boot grows in all sizes, from a sort of glorified shoe made of green "elkhide" with a water-proofed tongue, to a tall, laced-up-to-your-knee snake-discourager that would put an armor-plate greave to shame. You can get these commodities in all prices from $3 to $15, but the bootman's problem is to give you wear and strength in a light boot, and this cannot be done cheaply. You step 2,000 paces for every mile, and 15 to 20 miles is no great day's hunt. And this will be creeping up rocky slopes, hurdling through down timber, turkey-trotting over windfalls, gamboling lightly from hummock to hummock over the muskeg, and worming perseveringly through scrub brush. Wherefore, if you put more than a pound and a half of boot on each foot, your day's work is apt to be exhausting beyond the legal limit.

You can get almost any height and almost any

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specification for your hunting-boot, but I would limit the weight to about 3 pounds 6 ounces.

I do not attempt to pose as an authority on leather tanning processes. Some of the best boots made are mineral-tanned; others equally as good, if not better, are vegetable-tanned, and these manufacturers vehemently abjure all mineral processes as "unnatural." To my mind, as a civil and electrical engineer for twenty years before going exclusively into the outdoor game, there is little difference in the chemistry of leather if either process is correctly and honestly carried out. Fixing the leather fibres by chemical action is the object of all tanning, and the vegetable processes will naturally take longer than the mineral because the tannic properties are less concentrated in barks and roots than in the chemical salts themselves. On the other hand, if the mineral processes are unduly hurried, your leather will be acid-burnt and have little durability. Following the tanning, the leather must be oil-impregnated to resist the destructive action of alternate wetting and drying, and here the vegetable-tan man uses animal oils and the mineral-tan party may or may not use mineral oils. Just why alum and potassium bichromate tanned leathers should require some form of petroleum oil to follow is not apparent—certainly not the small amount of sulphuric acid present in the tan-liquor. I have

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used neat's-foot oil and animal grease on mineral-tanned mocs and boots for years without any harmful results whatever.

However, let us prescribe for our hunting-boots honest, A-1 quality vegetable or mineral tanned grain leather, not buffed; calfskin or "elkskin" for the uppers, not over 1-16 inch thick, soft and pliant; for the bottoms or vamps, grain leather cowhide or "moosehide" 3-32 inch thick; inner sole attached to welt by some sort of water-proof seam or else bottom carried up in one piece to form a vamp; outer sole of oak-tanned hide leather stitched to welt—no nails—protecting counter and tip at heel and toe; built-up heels of oak-tanned hide leather plates; bellows tongue water-tight to the top; rawhide lacers, large eyelet holes—the larger the more grip they take on the leather and the less likely to pull out. Weight not over 3½ pounds to the pair in the No. 12 size. All the boot people are excessively modest about cataloguing the weights of their product, but an inquiry will usually give you the facts, and many of the sportsmen's outfitters give the weights of all the boots they carry. The manufactured sizes run from 6 to 12 in men's boots, 3 to 6 boys' and 4 to 9 ladies'. All of them append an order blank with measuring diagrams, so as to fit you by mail, and some factories will make the entire boot to order if they cannot fit these measurements with stock sizes.

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In no case is it necessary to go the factory to be fitted, but the maker should always be told to allow for sock room and how many pair. You should always figure on at least one pair, and customarily for one pair of ordinary street socks and one pair of heavy knit ones. These latter come up over your trouser leg or cuff of riding-breeches, secure with a garter, and turn down the overlap.

As to the kinds of leather used in hunting-boots, I venture to state that they all come out of the Chicago stock-yards. It is what the maker does with his hide that counts; how he tans it; whether or not he rejects flanky and oil-rotten spots, etc., rather than the kind of animal that the hide grew on.

"Moosehide" and "elkhide" are in the nature of things trade terms, for neither animal is salable in the States where it can be hunted, and, with the exception of a few moccasin-makers up in the woods of Maine and Wisconsin, genuine moosehide is not used, nor is it essentially any better than tough old Texas steer.

For mountain work, either hobnails or screw calks are essential. In the Alps we always considered two sure signs of a tenderfoot to be a shoe full of hobnails and an alpenstock that would not hold its owner's weight when used as a trapeze bar. The real glacier stormer will have but ten hobs or calks in the sole and five in the heel, any one of

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1 2

3 4

FOOT-WEAR.

1. Mocs and socks for snow-shoeing. 2. Larrigans for the canoe trip. 3. Hunting-boots. 4. Rubber hip-boots for salt-water gunning.

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which will withstand his whole jumping weight; and the nails are far enough apart to get into the crevices of the rocks and stick; and, as for the alpenstock, he is more than likely to carry an ice-axe instead.

Midway between the boot and the moc comes the popular cruiser, or shoepack. It is essentially the heavy man's protest against the too-thin and too-flexible moccasin. A sole and a heel are added to the moc, and to do this without leaking through the stitches the moccasin is made double, the outer sewed to the welt and the welt being sewed to the sole. To support the arch of the boot the sole is also curved up under the instep. Many heavy men suffer from falling arch, especially on flat city streets, but this trouble is far less likely to assail one in woods tramping. Cruiser mocs come in sizes from 3 to 12 and heights from 7 inches to 16 inches. A good average specification would be:

Bottoms and uppers of strong, water-proof grained leather, heights 7 to 16 inches, double or single bottoms, flexible oak-tanned leather out-soles, hand-sewed to the welt, the latter curving up to the seam joining the uppers. Stitches *into* but not *through* this outer sole or welt and through the outer sole. Heel added, if desired. Rawhide lacing, water-tight bellows tongue. A good moc for a heavy man.

For still-hunting, and especially where there is

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snow on the ground, an ideal boot is the leather topped "over," as this boot not only keeps the feet dry in a wet snow but with a heavy pair of woolen socks you can keep going all day without hurting your feet. Another thing to consider is that you can go through the woods over dead limbs and twigs, etc., with this boot as quietly as with a moccasin.

And in all these high-top boots be sure and knot the lacing over the instep before lacing up the calf. Otherwise the instep will steal lacing from the uppers, with the result of shutting off circulation in the calf of your leg.

For marsh and duck shooting neither the shoe nor the moc is suitable. You can worry along with either, but sooner or later a marsh hole or a salt creek gums the works, and that usually when there is a flock marked down just across the creek or a cripple is leading you a merry bog trot over fathoms of black mud. And in duck shooting some one has to wade out now and then, even if the stools are all placed from the duck boat; so a pair of rubber hip or thigh boots are a necessity unless your partner is always to be "it." Here again quality counts for lightness and durability. The better the rubber, the longer they wear and the less they will tire you. A good pair can be had from four dollars to six dollars. Below four dollars the boot is dear at any price. And be sure to include a pair of wool boot socks, for they

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not only keep your feet from freezing off but save you from becoming the landlord of a fine crop of world-beater blisters due to the chafing of a loose boot.

For surf fishing, too, the hip rubber boot is the only foot-gear. On the flat Long Island beaches you have to wade well out into the undertow to cast far enough so as to land beyond the breakers, and on the Jersey, Virginia, and Carolina coasts to land your lead in a likely hole often calls for a hop, skip, and jump down the undertow to the edge of the combers, as you hurl the bait over 200 feet into the fishy ocean.

On trout streams there are three kinds of foot-gear, each one having its own best time of year and type of stream. In the early spring when the ice has just gone out you will invite cramps and rheumatism if you wear anything but water-proof foot-gear and lined inside with wool socks at that. For a rocky stream with few large pools and plenty of bowlders for fording, a 15-inch-high pair of water-proof hunting-boots with steel calks in the soles will answer, and in mid-summer either a pair of holey shoes or a pair of rubber wading stockings with hob-nailed canvas shoes will answer. These will require wool socks made especially to wear in between the wading stocking and the canvas shoe. They protect the rubber from chafing with sand and canvas inside the shoe and add appreciably to the

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warmth of your foot. Waders come in sizes 6 to 12 and all heights from waist or breast high down to thigh height. They can also be bought with leather, hobnailed soles and an instep strap to tighten over your foot. A rubber repair-kit is essential for any cold-water trout trip, as leaky waders are no waders at all. If you already own a pair of rubber boots a happy solution of the wader problem is a pair of leather wading sandals to prevent the boots slipping and covering you with obloquy, wet breeches and profanity. They have adjusting straps which will take any size boot and plenty of hobnails in the toe, the heel being absent.

In the higher boots some sort of buckle strap is advisable for quickly and strongly tightening the boot around your calf. Side lacings are also furnished to be adjusted once for all for the weight of trousers or socks underneath so that the leg will come snug when laced up. A compass pocket on the boot side is a favorite wrinkle with engineers and might well be specified by sportsmen, as with a hunting-case compass safely ensconced in your boot-leg it is difficult to go hunting without taking it along, no matter how much you change your clothes.

Speaking of the difference between engineers' and sportsmen's boots, it is well to reflect that the engineer wants durability above all things, even at considerable weight. His job is day in and day out

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all the year, and he is not necessarily tramping all the time. He may be putting in a lot of time over his instrument or standing around bossing a gang of "wops" on a concrete job, so a few ounces extra weight do not bother him enough to sacrifice any durability. The hunter, on the other hand, must cover a lot of territory every day and his total wear on the boots will be only a few weeks each year. Wherefore he looks for ease, flexibility, and lightness, even if his boots are not so durable as the engineer's.

Let us look for a minute at some foot-gear habitually worn by lumbermen and trappers. A popular boot in the Hudson Bay Company's empire is the botte sauvage of the *voyageur*. This is in effect a cowhide boot and a cruiser moccasin all in one, with a strap over the instep for close fitting when a sock is put on under the boot.

The lumberjack, who works in wet snow, swamp, and river the entire winter and spring, uses larrigans with rubber bottoms or rubber arctics with felt leg-boots inside. The sportsman can spend several weeks in an almost normal condition of wet feet without suffering in mild fall weather, since his wool socks keep his feet warm in spite of the wet; but in midwinter and raw March such a course would result in cold and pneumonia. Wherefore, rubber, the best and liveliest procurable, forced into canvas and leather for the bottom and uppers, and we get

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the lumberman's larrigan—water-proof, mud-proof, and slush-proof. Comes in six heights, about four dollars and fifty cents for the 10-inch, with or without rubber heel. It's a great favorite with trappers and woodsmen who have a good deal of snow and wet to work in week after week. The lumberman's arctic is one-buckle and two-buckle, water-proof to the top, and inside he wears thick felt boots, about three dollars a dozen, and he keeps a lot of these drying while one or two pair get wet in the day's work.

These felt inner boots are snow-proof and warm and do not get wet unless slush must be waded in above the top of the arctics. In the general run of work one will get along all day with warm, dry feet and there is no constant greasing needed as with leather mocs, larrigans, and "shanks."

Finally, snow-shoes. You want the bear-paw for firm, wet snows in wooded country; for open work in dry, drifting snows the standard type, 48 to 54 inches long by 13 to 15 inches wide, bows of black ash, coarse, flat filling of caribou-skin lacing. The Cree three-bar shoe, 60 inches long, owes its type to the fine, powdery snows often encountered in the far north. It has fine filling and large toe sharply bent up so as to stand considerable sinkage. As an exact opposite may be instanced the Adirondack type for heavy, wet snow, coarse filling, heel and toe open; length, 42 inches.

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CHAPTER XIV

CAMP COMFORTS

ONE of the hall-marks of the veteran woodsman is the way he contrives to make himself comfortable in camp, mainly by utilization of the forest materials ready to hand. He has gotten past the stage of unnecessary roughing it, knowing well that the hardships of the hunting trail will be quite enough without imposing any additional burdens in camp. Doctor Hornaday, than whom there is no more experienced wilderness traveller, has small patience with the man of harrowing experiences afield or with the novelist who builds his themes upon the sufferings supposedly inevitable in the waste spots of the earth. These who so suffer simply do not know the game, are inadequately supplied with either equipment or knowledge, or both, and richly deserve all the misfortunes that befall them or are heaped upon them by the malignant novelist. He, and many another veteran explorer, has proved in his own person the truth of his argument; any man who can and did make the Pinacate trip virtually without a harrowing incident

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or can spend two years in the Malayan jungles without serious misfortune surely is entitled to speak strongly on the subject. Doctor Wallace, the English naturalist, spent eight years in the Malay Archipelago, living in the open the entire time, also with no incidents of battle, murder, and sudden death to relate.

As in the game of life, it is attention to the little things that counts, the *savoir-faire* that enables a man to guard himself, seemingly without effort, against the petty annoyances which the wilderness sets over against him for a pitfall and a gin. This body of ours has certain needs which intrude themselves upon our consciousness at regular intervals and give us distress until satisfied. It must be fed, couched in a comfortable nest at night, and washed, shaved, and curried periodically, besides which it demands a change of position occasionally, objecting decidedly to the standing position all the time; and it is annoyingly vulnerable to insect attack.

Nature has provided no comforts at all, and she launches her armies of insect life or her legions of chilly particles of air and water against the poor body without respite and without pity. The veteran woodsman automatically puts up screens against any and all these annoyances with the same skill with which he follows the faint game track. Com-

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fortable sleeping, comfortable eating, comfortable cooking, and comfortable washing are his without fail, for he knows the necessity of guarding the body against the fret and wear of minor hardships.

Comfortable eating is the feature most often neglected by the tyro. To grab a plateful of food and squat down somewhere not out of range of the acrid smoke of the camp-fire seems to him all right and part of the fun. So it is, for the first day or so maybe, but it soon palls. The necessity of an eating-table of some sort has been given much study by veteran outfitters, so important is it in the long run. For the permanent camp the log and plank tables shown in our illustrations solve the problem amply and, with a log bench on each side, make for comfortable, happy meals. The right height for a table with benches is 30 inches (the length of your gun barrels), and the height of the bench is 18 inches, from soles of feet to just below the kneecap. If the meal is eaten standing, 40 inches is a better height for the table. A mere plank, or two logs side by side and packed in with pebbles to form a level surface, will make a very comfortable table for four men and will not take over an hour's time with the belt-axe for some ambitious member of the party. A four-log table, also gravel-filled, will take a setting for eight, the logs being 4 inches in diameter by 6 feet long, and a light fly over it makes eating in rainy

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weather possible without bringing the food into the tents. But what of the nomadic camps, such as on a down-stream canoe trip where no stop is made long enough to warrant any extensive construction? For this the outfitters have gotten up a wooden suitcase, made of the hardest and toughest veneers, light and strong and rendered water-proof by a rubber gasket running around the joint between the faces. Such a suitcase will be 5 inches deep by 30 by 16 in area and holds all the smaller provisions or sometimes a complete aluminum cook-kit of pots of the right height to fit inside it. When making camp, four stakes are cut and driven in the ground, the suitcase opened out flat, and at once you have a table 30 x 32 inches useful as a cooking-table and bread-board while preparing the evening meal and later for setting the aluminum table-service upon.

The care and stowage of provisions is another matter apt to wear and abrade upon the chef's mental economy unless automatically met by various little woodsman's dodges. Mice, squirrels, and porcupines love to get into a provision cache left unprotected while the party is away on the day's pursuit of game and fish. Also ants, which will march in regiments upon all foodstuffs left in their reach. Two devices for thwarting them are shown herewith, one used by the writer and the other by Lieutenant Townsend Whelen. Mine is a light

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maple crate which holds all the provisions when in some camp that can be reached by boat, canoe, or automobile. Turned on its side and swung by two stout cords from a pole nailed across two trees, it makes an insect and animal proof storehouse, as shown, and at night a light oiled tarp is tied over it. The folding cupboards sold by the outfitters serve the same purpose admirably, but are not good to pack in. Three flat boards 8 x 16 inches in size are enclosed on three sides by canvas walls and back tacked to them and, when hung up by the top board, drop down to form a three-shelf cupboard. The device is easily made at home by any enthusiast who has the time and the inclination.

Lieutenant Whelen's camp cupboard is shown next. A cross-pole laid between two trees on jutting stubs holds the straps of his knapsack and canteen, thereby hanging provisions and valuables out of harm's way and handy to get at. A woodsman's pothook, made of a forked stick with a nail in the lower end, is to be noted over the camp-fire. The point not to be overlooked in these rigs is the necessity for order and completeness in the woods. Things thrown about or left about in the leaves get lost much more easily than in any house and are impossible to replace. I will never forget the loss of a humble fork once from our kit in Montana. There were four forks and four hunters. About the

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eighteenth day out one of the forks turned up missing. Some one had to go without or wait his turn at the steak, and there was almost a row over who should be the man. However, I whittled a hardwood fork that answered during the rest of the trip and which was duly washed and carried along each day with the rest of the outfit. All small articles must have a place and be in their place when camp is struck, or one by one they will unaccountably disappear and their loss not be discovered until many arduous miles lie between you and the lost article.

For carrying provisions and culinary utensils, table-service, etc., it is hard to improve upon the side-opening food-packs described before in these pages. Two detail photographs are shown, giving some idea of what these bags look like, open and rolled up, and also of the paraffined muslin food-bags that go inside of them. Note the khaki pockets sewn to the back of the bag, in which are to be put the knives, forks, spoons, pepper, salt, and celery shakers, dish mops and towels, soap, can-opener, cooking-gloves, and pothooks for the trip. When these bags are rolled up, a glance into these pockets will show at once if anything is missing, and *then* is the time to look for it. When cooking, the muslin food-bags lie side by side in the packs, easily found, and, what is more important, easily replaced, so that they can be found again. That is where this

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pack is superior to the ordinary end-opening war-bag. On laying out the outland kitchen the chef hangs up one or more of the side-opening bags by the stout hickory rods which are sewed into one lip of each bag and provided with a grommet hole at either end of the seam for that very purpose. Two stakes driven in near the cooking-fire serve to hold up the pack with its side hanging open to the hand. As fast as the provisions are used the food-bags are chucked back into the pack, and from it also are taken the table-service utensils when needed. At night the bag is closed up by its straps and is then water-proof and animal-proof. Even in the case of an upset the provisions will come by no harm, for the rolling up of the two lips around the wooden rod makes a seal quite as tight as the pucker string of the ordinary tump-bag. The large cans shown in the second illustration have friction tops and will hold pork, bacon, and butter; some 4 pounds' weight in the shallow cans and 8 in the deep one. To pack the bag, stand it on end with a single paraffined bag on the bottom; next a large can, then the other bags one atop the other; finally the two shallow tins, and then squeeze in a muslin bag for a buffer between them and the end of the pack. The normal diameter of both bags and tins is 8 inches, and the muslin bags assume a thinner or thicker depth with the same diameter,

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depending upon how much provisions are carried. I have taken provisions for a party of eight for two weeks in two of these side-opening grub-bags, each weighing 40 pounds.

One of the handiest kinks I ever saw in the way of camp comforts was a combined eating, cooking, and sleeping camp, made of a canoe and two 6 x 12-feet green silk shelter cloths. When camping time came, the canoe was hauled out and carried up to the camp site, where it was turned on its side and hoisted up so that it could be lashed to two trees with its lower gunwale about 3 feet from the ground. The two shelter cloths were next pegged down to the ground behind the canoe, overlapping each other somewhat, led over the back of the canoe and forward over the space in front, where they were guyed out with poles and guy-ropes led down to pegs in the ground. In front of the canoe, under the shelter, were then driven four stakes, upon which a wooden suitcase was spread out bottom up, making a table, and the fire was located just in front of the edge of the shelter cloth. All the food-bags, cooking-pots, etc., were spread in a row along the bottom gunwale inside of the canoe, which formed a most excellent shelf; and then bread-making, and food preparation went ahead merrily under shelter in spite of a rain outside. When the meal was over the suitcase was lifted off out of the way, its stakes pulled up, and the

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SIDE-OPENING FOOD PACKS OPENED AND ROLLED UP.

SOME OF THE PROVISION SACKS AND FRICTION-TOP CANS FOR BUTTER AND PORK.

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party gathered under the shelter cloth before the bright camp-fire blaze. After a while the sleeping-bags were rolled out, their pillows coming under the canoe up against the shelter cloth at the rear, and there was ample room for five men to sleep in a row. The two shelter cloths weighed 2½ pounds each, and the canoe, which held all the provisions, duffel, and cooking utensils up out of harm's way, being part of the scenery, could not legitimately be charged as weight at all. In other words, on a weight of 5 pounds this idea provided a cooking, eating, and sleeping shelter for five men.

In making oneself comfortable for the night a number of comforts are attended to by the seasoned camper as a matter of course, nor will he go to bed satisfied until they are to his mind. There is plenty of time to make oneself a suitable sleeping-place in the hours between finishing with supper and bedtime, and one sign of the inexperienced man is his anxiety to attend to his sleeping quarters about sunset when he ought to be helping the others in preparing supper or else cutting night fire-wood, for no axe work should be done in the dark. All this out of the way, however, and the dishes washed and set aside, the veteran will roll out his sleeping-rig and see to it that it is comfortable before retiring. The subject of sleeping-bags has been thoroughly treated in these pages before, and will not be gone

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into here, merely adding here a few cautions such as to see that the bed site is level ground, particularly in the side-to-side direction, for sleeping sideways on a slope is one of the impossibilities of the outdoors. If using a very thin mattress, such as a skin or quilt, see that suitable hollows for hips and shoulders are scooped in the duff and filled with dry leaves, your aim being to distribute the area of your body as evenly as possible, so that all of it may be supported and not have the whole weight concentrated on hips and shoulders. And arrange some sort of windbreak, made of any available cloth or duffel-bag, so that the prevailing wind will not sweep over you at night. Outside of water-proof gabardine or silk I know of no weave that will not let night winds creep in and steal away by conduction the bodily heat that you depend upon for night warmth. Cautions about sleeping with too many clothes on seem almost superfluous, yet men *will* go to bed of a cold night with so much clothing on them as to cause uncomfortable sleeping and be colder in the end than if without them, due to the hampering of free circulation during the sleeping hours. Better put these extra things on outside the bag and under the dew cloth, reserving only a few soft undergarments for night wear. A pair of warm, dry socks and wool sleeping-slippers are almost a necessity in freezing weather, for one's feet are not constructed so as to

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resist much cold, and the chilly, cavernous lower regions of the sleeping-bag do not seem to help much either. At the upper end attention will have to be paid to details also. Man cannot sleep in temperatures below freezing with his head outside the bag without a night-cap, and if he pulls the flaps of the bag high enough to cover his head he does not get enough outside air for breathing purposes. A wool skull-cap or night-cap solves the difficulty and is one those little things that are not overlooked or made light of by the veteran. In the same category is the pillow. Without it some men, particularly if of high-strung mentality, cannot get along. One does not have to pack anything of any size; a mere pad will do, so that it has a fine, smooth surface and a soft feather or wool interior. It is intended to cap the pile of duffel and spare clothes that you will build up at the head of your sleeping-bag to raise your head to the level which suits you personally when sleeping. On this your head can lie serene with the small pillow under cheek, even if the lower components of the pile include such lumpy commodities as a pair of leather hunting-boots stuffed with leaves.

All these little night comforts, besides your toilet-kit, must go somewhere, in a water-tight bag or a dry poke, so that all of them will be in one place and not scattered through your duffel when wanted.

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Perhaps as good a receptacle as comes for the purpose is the kit roll, about 16 inches long by 8 inches wide when opened out flat, and which is provided with rows of pockets to hold soap, shaving tackle, comb, and brush, night-cap, night socks and slippers. looking-glass, tooth-brush, mending-kit, etc. This is hung up on two stakes alongside your sleeping-bag, and then each article is handy and there is a place for every one of them when you get up in the morning. As you divest yourself of knife, watch, compass, pipe, bandanna, belt, tobacco-pouch, electric flasher, and the like, on retiring, these go into the pockets lately occupied by the night outfit, and atop of one of the stakes is just the place to swing the carbide lamp by its pointed hook. When packing the kit up in the morning the pillow is folded flat and laid lengthwise across the roll; an inspection shows that all the articles are in their accustomed pockets, and the kit is then rolled up around the pillow and tied with its tapes.

On dressing in the morning, after one's hunting-boots have been softened up and put on, the first thing wanted is a good wash; and the thing to do it with is hot water, poets and amateur campers to the contrary notwithstanding. A very little out of the cook's big boiling water-pail will make an astonishing quantity of water as hot as your face can bear, and so you sidle up to him with your folding

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canvas wash-basin already part full of cold water and get a dipperful. Somewhere at the bottom of your tump-pack, or flat in your knapsack should be a small, 12-inch canvas basin of this type. It folds down flat as the proverbial pancake, and opens up to about 3 inches high, and it's one of those little comforts weighing an ounce or so that will repay its weight by keeping you looking fresh and well and feeling so, too.

Along after dark in camp, another bodily infirmity makes its presence known, the inability to see things in the dark (and especially to find a lost belt-axe or salt-shaker). No man in the party should be without his own light-producing apparatus; carbide lamp, candle lantern, or electric flasher. The camp-fire and one or two carbides will just about supply enough working light for the cooks and firemen; meanwhile you have your share of the work to do, to get water or go skirmishing for dead trees in the dark and should have your own lantern. Personally I am never without both a flasher and a small carbide, the latter usually loaned for general illumination as soon as it can be filled and lit. Our illustration shows one of the types of candle lanterns, very popular for individual and tent lighting. It collapses flat in your pack and takes very little space and weight—9 ounces—and it has the advantage of being always ready to light and can be

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put out in a second, which the carbide cannot, so that one is loath to light the latter merely for some private errand of short duration, but rather it is held until after nightfall, when it is lit for its run of three hours and is then at the service of the whole party except when you need to borrow it for private purposes. Neither it nor the candle lantern can be blown out by any ordinary breeze, so that they are reliable and serviceable in rain, snow, storm, or almost any weather conditions that obtain in the wilderness. The electric flasher is no doubt the handiest individual light of them all. Carried in your pocket after nightfall, it gives a strong light, always available on the instant, and is a great convenience for finding things in the dark, reading the compass when night travelling, finding tools and trees in the woods, and looking over everything at night before turning in. In getting one, see that its button is of the sliding variety; otherwise it will quite likely set itself going in your pocket, using up the good current for no available purpose. The button should also stay put at will, for there will be times when you may want to set the light down and use both hands for a considerable period of time.

In mild weather, from early spring to late fall, the dusk and the early morning are the grand display periods for insect life. Mosquitoes, no-see-ums, and

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black-flies hover about in countless thousands, and woe betide him who has no protection against them! The ten-cent brown cotton camping-gloves, worn when cooking or paddling, will render your hands immune from their attacks, and a light head-net is the only really comfortable defense for your face. Oil of citronella carried in a nickel screw-top oil-can and sprinkled on the net front will keep them from lighting on it and singing you to death, while the net itself, if of the kind that straps securely to your shoulders, will hold them at bay from doing you personal violence. The net is a light and easily stowed comfort, and one will not leave his behind, nor two of them if on a long trip, after one encounter with the ungodly, unprotected except by fly smears and "dopes."

In permanent camps, a quantity of light, easily packed and transported camp furniture will be worth the owning, particularly if the stay is to be a long one, for it is the little comforts in the long run which decide whether such camping can be called a failure or a pleasurable experience. Such conveniences as folding chairs, cots, tables, bureaus, tent clothes-hooks, etc., are utterly out of place in travel camps into good game and fishing country, but they have their place in tenting beside some lake where the fishing is good, and where a team is to bring in the whole establishment and the party is to spend an

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entire vacation in one spot. In such camping one should not scorn these light and easily transported articles but get together the needful equipment of them, for it cannot be too much emphasized that they will contribute manifold to the enjoyment of such a camp. Take what your transportation facilities will permit, and don't listen to the man who laughs because up in the Maine woods no one but tenderfeet use these things! So they do—the blessed innocents—but it is because of ignorance of what can and cannot be carried in the wilderness rather than because of any intrinsic lack of merit in the articles themselves.

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CHAPTER XV

CAMP ORGANIZATION

ESSENTIALLY a camp consists of a group of tents, a fire, and a fat man for chef. The rest do not count—as essentials. But, even with the above, and of extra-fine quality, the camp may be a sorrowful memory unless a certain amount of organization, of routine, is agreed upon and lived up to. I have known camps where the star hunter blandly laid him down on the browse that others had picked, and informed all and sundry that, as *he* knew nothing whatever of fires or cooking, *his* job forthwith would be to keep the camp in game! Whereupon the fisherman, taking his cue, declared that *he* would attend to the fish market, and the naturalist, following suit, arose to remark that cooking and dish-washing was no gentleman's job, and that *he* would attend strictly to the fruit supply. Just at this juncture the cook appeared in the doorway with the camp-bench poised above his head, vociferating that, by the devil's caldron, if all three of them didn't dig out and rustle fire-wood, slick up the camp, and clean *all* the pots and pans in less than two

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minutes, *he* would beat them all as flat as so many Shrovetide-pancakes!

It was lucky that the cook was a large, fat man with a choleric blue eye, for too often the chef is only a little, measly, mild-mannered individual, whose only reason for going into the woods is an abiding love of outdoor life, and so the others impose on his good nature, forgetting that he may be as keen a hunter and as ardent a fisherman as any of the rest. There should be a separate job for each of the party, and the more onerous ones, such as washing dishes, should be taken in turn. If the party is of the right sort of woodsmen, no one wants to shirk, and each will naturally choose the duty that suits him best. For instance, there will always be one who loves an axe almost as much as his rifle. The very exercise is a joy to him, and the play of the axe muscles eases all his joints with a satisfaction that he has waited all the year in the city for. He prides himself in being able to split a hair, to chop a cut like fine joiner work, to lay a tree to a plumb-line; let him have the night wood and the cook-fire wood exclusively under his charge.

Then there will always be some brother whose sense of order is so inborn that it gives him the fidgets to see anything at sixes and sevens—his shall be the job of keeping the camp slicked up, bedding aired, sinks dug, spring-houses constructed,

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mess-table built, and dozens of other camp comforts attended to. The naturalist just naturally takes over the care of water-supply from the spring, berries from the patch over on the shoulder of the mountain, watercress out of the brook, mushrooms from the fields. And all three of them take the dish-pan job in rotation.

And then, there is Monsieur Le Chef de Cuisine. On him depend the health and good spirits of the party. There is positively nothing wonderful about cooking, but your really good cooks are neither born nor made, but spring, fully educated, from the loins of Lucullus himself. Any fellow that likes chemical experiments or has a hankering for manufacturing processes from the raw minerals of the earth will make a good cook. It is nothing but a chemical reaction—so much heat applied for so long a time, and you have the result. And the combinations and blends are endless. Every woodsman should know how to prepare everything that his rod and gun get him and how to use the simplest herbs and plants of the forest. But the man in whom the study of food preparation is a yearning and an art, a consuming interest, is the one who naturally steps forward to be cook.

To perform the chemical operation aforesaid requires the application of just the right heat for just the right time. Therefore, it is impossible for

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the cook to get results in the open if he has to leave his job continually to rustle fire-wood or water. These *must* be right at his elbow, and the other members of the party must put them there, as getting the meals takes a lot of the cook's time, and no man in the party should have to take any more time than any one else away from the pursuits of the sports that all came into the woods to enjoy. Neither should he wash dishes or set the table. Once the meal is cooked and served, the chef's work is done, and he should be allowed to return to his pipe in peace.

It is the most delightful fun in the world for a party of four to live in the virgin forest beside some sheet of fishy water and draw from Nature alone all the comforts and variety of life that the most exquisite civilization can afford. Any camp that is suffering from monotony of diet doesn't know the game thoroughly, for, even within fifty miles of New York City there are hundreds of camping grounds that will give endless variety of diet and sport. The ideal loafers' camp misses the trout, as it must be in September to get warmth and yet get the cream of both hunting and fishing. One still has bass, pickerel, perch, sunfish, snipe, woodcock, squirrel, 'coon, woodchuck, possum; crabs, oysters, and clams (if near salt-water); and one can go a-frogging, bobbing for eels, catting by jack-lantern, "'cooning in

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de dark ob de moon"; berries are in profusion, and, if there is a cornfield in twenty mile, "dar is sweet co'n an' melons."

Let us glance over the layout of such a camp for a party of four. To begin with the tents: I never cared much for any of the wall-tents and A-tents for a party to herd in except under special conditions, such as mountain work. One is too crowded. There is too much strain on the give-and-take requirements of one's good behavior for it to last long without quarrels. Four big, husky men crowded into a 12 x 16-foot army-tent are pretty sure to step on one another's toes before long. And then, to pack the thing means heavy penitential labor for one or two of the party, as it cannot be divided between them. If the camp is on water somewhere, as all camps worthy of the name must be, it is best reached by canoes, and a large tent is a dangerous and heavy burden to paddle in any canoe. The camp becomes much more cosey and homelike, more like a little community, if there are three or four small tents, all fronting on the night fire. I was driven to devise the "Forester Tent," first described in *Field and Stream* in "Camp Fires of an Epicure," nine years ago to meet this requirement. It will sleep two very comfortably, and three of them, pitched around the night fire on three sides of a square, form quite a settlement. One can then chum in with his particular Fidus Achates; and hu-

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man nature is always such that in any camp there is somewhat more affinity between some members than others. They naturally hunt in pairs according to temperament. In effect, it gives each man a room to himself, and, as these tents only weigh 5 pounds, they are easily transported and divided about the party. For a camp lasting all summer I prefer some sort of a shack or bungalow, in which permanent comforts can be built, to *any* form of tent, but for a camp of from one to three weeks the little open tents are ideal.

The Orderly Man will have them all in tow. Every man likes neatness and comfort, but few will take the trouble to keep their nest trig and shipshape. Let brother Orderly police the whole encampment. That's his job. He hangs out every man's blankets, sweeps up all the camp enclosure, sets all the tents to rights, turns over all the browse and makes up all the beds; his pride being that the entire camp looks eternally like a new pin. This done, let him take to his favorite rod and enjoy himself the rest of the day.

The Man with the Axe comes next in line. To begin with the night-fire: I've tried all kinds, and the one described by old Nessmuk in "Woodcraft" is the finest of them all. It gives you a cheerful blaze all night long, and the heat is thrown directly into the tents so that the night chill is driven out

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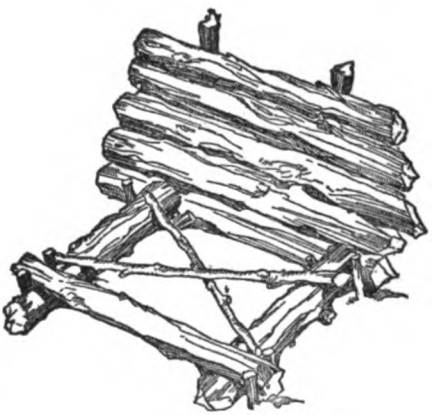
and one sleeps like a dormouse. To make it you first cut two stout beech stakes about 3 inches thick and 4 feet long. Drive them a foot into the ground, slanting slightly backward. Next get out six 6-inch logs of beech, red maple, black oak, or green pine,



THE "NESSMUK" NIGHT FIRE.

each about 4 feet long, and pile them up one on top of the other against the stakes. They are called the "backlogs," and their function is to head off the heat that would otherwise be dissipated into the forest and to reflect it into the tents. The logs for it are cut of green wood, so that they will not burn out too quickly. Next you need two more green 6-inch logs, about 3 feet long, for andirons. These are laid running out toward the tent from the back-logs, about 2 feet apart and staked in place. Across

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them at the extreme front goes another green log, about a 4-inch, called the "forestick." A rough grid of small green sticks is laid in between it and the backlogs and a pyramid of chips and fagots built on them, topping off with short 4 and 5 inch dry timber logs of chestnut, birch, maple, and elm. The conflagration is touched off just at dark, and you at once get a blaze 6 feet high that will last till turning-in time. Twenty 4-inch logs and a quantity of fagots will last this fire during the night. Put on seven or eight when the crowd turns in, at 11 P. M. About 1 A. M. some cold-frog is sure to wake up, rake together the glowing embers and pile on more fagots and six or seven more logs. As soon as the warmth of the blaze strikes him he dozes off. Along about 4 A. M., when the early squirrels are racing about the woods and the chorus of the birds is in full blast, some light sleeper will turn out and reorganize the tumbled-down backlogs and put on all the rest of the night logs. By six or seven in the morning, when the whole camp turns out, the fire will again be a mass of glowing embers and in beautiful shape for breakfast culinary operations. The last two of the backlogs are laid side by side across the andirons, which are still in the game, and on them are set the coffee-pot, frying-pan, flapjack-skillet, and anything else the chef's soul may elect. If he is a real fat chef he will have buried some

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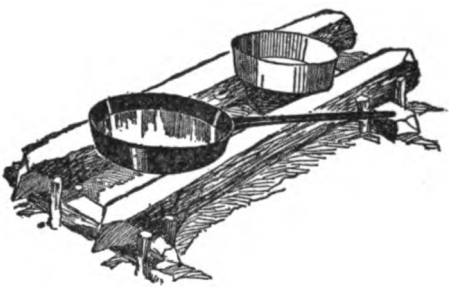
'taters in a hole in the ground under the forestick the night before, so that all he has to do is to go a-grubbing to have hot roasted potatoes for breakfast with the fried work.

It is now high time that the water department got in some good "licks." There is a plenty of pails



WOODLAND COOKING RANGE.

of fresh, clear spring-water wanted at once, and he should not have to be told. Furthermore, there is no greater pleasure than an early-morning picking at the berry patch in the fresh, smoky dew or a trip along the trail beside the brook down to the little swamp where the brook pauses awhile to allow a patch of cress to take root.

After breakfast it is the orderly man's turn to show what he can do. He should be a confirmed and an habitual potterer, a man who is happiest when he has taken half the morning to get that d—n pipe lighted and is fooling away the other half

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making a new camp-broom out of huckleberry switches. He gets out all the blankets, hangs them in the sun on the camp clothes-line, sweeps them all clean of browse litter with the huckleberry broom, rigs up a cupboard of the chef's soap-box (which he fills full of doodle-bugs, just to show that there is no hard feeling), constructs a camp-lavatory between two trees by nailing two parallel saplings on each side of the trees, on which the basins can be set in a row, and finally dodders off to the lake, where he gets out a line and hopes the fish will not interrupt his reading from Tennyson. The best one I ever camped with neither fished nor hunted. He was obsessed with one of those interminable novels of Victor Hugo's at the time, and invariably produced the cherished volume from some hidden recess in his blouse the moment his cork was out on the water. At periodic intervals he would be waked up with the yell: "Eber, where in the *devil* is your cork?" and the whole boat would take a day off to unsnarl his tackle from the roots and stumps around which the fish had wound it.

And the fourth is D'Artagnan—le chef! To begin with, he must be a poet and an artist—and, furthermore, he must know how to cook. There is nothing to it. More good jobs are spoiled by too much fire than anything else. It is the application to the utensil of the heat that proves the master. You

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can't cook by shaking up a heap of fagots and wiggling pots and pans onto them the minute a few feeble flames begin to show up. For dinner and supper you want a good range, and the best woodland one I know of is two green logs laid side by side and staked in place, being held a few inches above the ground by two short cross-logs under their ends. Tyros always lay the logs flat on the ground and then wonder why the fire is always feeble, or else too vigorous. There is no way for the air to get at the fire from underneath. Set the two logs on two short ones and the range will steam like a major.

For breakfast this chef usually takes the ruins of the night fire, because one already has a bed of sizzling-hot and well-behaved embers to start with. Coffee simply needs a grab of it to each cupful of water you put into the coffee-pot, with one extra to allow for evaporation. The French have a very handy percolator, a two-storied affair in which a cupful of grounds is put in the strainer and you simply pour on boiling water, which takes five or ten minutes to percolate through, and the clear coffee settles in the pot below. One can't pack such a contrivance into the blessed woods, however, as the duffel law should always be "agin it"; so the old-fashioned way is best. Let her boil up once, putting out all the fire for miles around, and then set it 'way off on the edge of the coals to simmer till

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wanted. Settle with a dash of cold spring-water before serving. As a mollifiant, nothing beats condensed milk in the woods—except condensed cream. For fish and the smaller game-birds the frying-pan is the thing. Here the sin of too much fire scorches many a good breakfast. It takes not much less than twenty minutes' application of heat to cook either fish or birds, and your problem is how to apply the heat to the frying-pan for that length of time without scorching the skin of the brute. By far the best fat is bacon drippings, and, as bacon is one of the breakfast mainstays, there should never be any dearth of drippings. If there is, you are having too much fried work and every one will get bilious. The ideal way to do a mess of fish is, first, to fry a chip of bacon for every man at the table. Turn them the instant they are brownish white and fish out as soon as the other side becomes brown, which will be in three or four minutes for the whole operation. In the pan will be left delicious bacon fat. Roll the fish in corn-meal and fry slowly for fifteen minutes, or until the flesh gets white and firm to the fork. Then whoop up the fire and brown both sides. Serve with a chip of bacon on the side and a garnish of watercress.

The same regimen is followed in doing fried potatoes, either sliced or stripped, but never have fried potatoes at the same time as fried fish or meat. Better make

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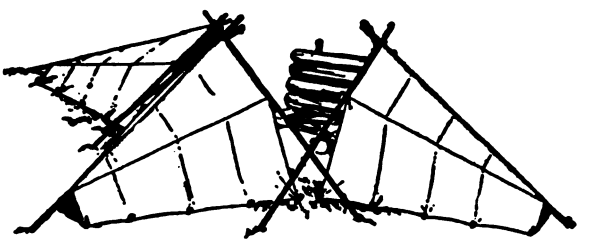
it baked or boiled with their jackets on. If you have milk, cut them into cubes and boil fifteen minutes, pour off the liquor for soup-stock, boil five minutes in milk with a thumb of butter, and serve as creamed potatoes. Don't try it with condensed milk, but evaporated cream will do admirably.

I seldom have cereals with a camp breakfast,



A "FORESTER" ENCAMPMENT.

because of the milk nuisance, but if same is handy and ye fretful cow inhabiteth the berry pasture, why, then one can have either oatmeal, cream of wheat, force, or any of the numerous cereal preparations on the market. But it is really necessary to have fruit, unless you want a steady prune diet for dessert, and there is no reason, with the woods full of huckleberries, blackberries, and lazy men, why the one shouldn't collect the other. As a variant on the potato, both rice and hominy are excellent. Both take about thirty-five minutes to cook and need plenty of water, as they wax amazingly as

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they cook, and should be given a stir every now and then, as they are prone to stick to the bottom of the pot and scorch. Nor should they have too fierce a fire. In all these cooking operations the chef should insist on having only legitimate cooking wood for his fire. Reject all pine and hemlock sticks that may be offered, or else everything will taste of tannin and creosote. You want sticks of oak, beech, chestnut, and maple for ordinary cooking, and birch, cherry, beech, and rock-maple for all broiling operations.

For bread substitutes the best I know are pancakes, hardtack and club bread. For the first there are plenty of good old "Varginny" pancake flours that simply require the addition of water to make a nice batter; the second is delicious when toasted before the fire to restore its original crispness, and its staying power is wonderful; the last is somewhat more complicated and has for its first step cutting down a healthy young black birch about 3 inches thick. This you peel and set up slanting over the fire, where it will get as hot as the Lid. Around it you wind a thin strip of dough made from self-raising flour according to directions or else from ordinary flour with a teaspoonful of baking-powder. Turn the club occasionally and keep up a hot fire with birch and cherry fagots. You will soon have biscuits equal to any in mother's oven.

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For dinners, with the long range there is plenty of time and room to cut a few pigeon wings. You can broil, stew, and raise Cain generally. To broil, take the fish, or snake, or bird, or animal, whatever it is, slap flat with the hatchet, butter and salt all over, shove it into the spider and on with it over a roseate bed of embers on the range. Keep the tail of your eye on it, while you boil one vegetable and fry another to go with it. I always take a couple of war-bags full of potatoes, beets, onions, carrots, etc., when on non-nomadic camps. These will keep throughout a long camp and work in for soups, stews, fries, and boils. In fact, you *must* have them if the camp is going to remain healthy and avoid canned diets. Just pare them and boil them till tender. That is all there is to it. Bubble in butter, or fry in thin slices in bacon fat, to vary the preparation. Another staple that is a bully mainstay is corn-meal. Stir into boiling salted water and boil slowly until done. It is then corn mush and is the base for dodgers, fried mush cakes, hoe cakes, thickeners for this and that, and general stock. Don't have coffee for dinner as well as breakfast. Too much coffee is at the root of most of the biliousness and general debility around most camps.

For supper a good gumbo soup, or "mulligan," is the one best bet. Get the kettle on about 5 P. M. Pare the potatoes, three or four onions, a carrot or

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two cut up into fine cubes, and little squares of meat. Stir occasionally and salt to taste. By six o'clock it will be the most appetizing thing you ever held your nose over. Serve one quart to each man with biscuits and strong tea, and stewed prunes, jello, or fruit for dessert.

Mention of desserts brings me right to can, so to speak. I let down the bars on canned pears, apricots, and all their relatives, for they are all fine and wholesome. If you can reach the camp by canoe or buckboard, by all means take in a few cans of fruit, peas, corn, spinach, and other winter staples. But if on a travelling camp, where you have considerable get-there to allow for, be sure that the packs contain no cans, and rely on prunes, fresh berries, and dried apricots, peaches, and apples that can be carried in little canvas sacks.

A final word—on cleanliness. When the tyro camper comes out of the woods his first dash is for the tub, where he soaks out three or four weeks of grime; his next is for the barber's, where a fuzzy stubble is hoed off; and the last is to the haberdasher's, where he gets on him all the stiff chokers, pink socks, and nobby ties that his purse will permit, "to forget the backwoods."

He hasn't really camped, you know. He just slid gracefully back to savagery because the well-dressed city crowd was not present to shame him.

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Now, in camp one should be cleaner and nattier than anywhere else. There is plenty of exercise to keep the pores open, and one can bathe all day long and get a fine, healthy coat of tan all over one's hide without half trying. If there is a better or more healthful summer-camp apparel than a good jersey bathing-suit without any sleeves, I have yet to hear of it. For strenuous work there is the gray flannel shirt and the forestry suit and hunters' shoes. Set one day a week for washing, have plenty of hot water, and take along a small sack of washing-powder—and mind that you do not try to make corn mush with it!

In a word, cut out all dirt and petty annoyances and live as nearly as you're accustomed to in your own home as your brains and ingenuity will permit.

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CHAPTER XVI

BUILD YOURSELF A PERMANENT CAMP

THERE are all sorts of camps, from the hasty *voyageur* bivouac of the big-game hunter to the serene summer retreat when one invites his soul to ease in Nature's lotos-land—that "place where it seemed always afternoon." Indeed, I think that the quintessence of camping is reached when one knows the game thoroughly enough to be able to draw from Nature alone all the comforts that civilization affords, in addition to the thousand joys which no civilization can give. It is far easier to do this than one would suppose, for the reason that most of the drawbacks of camp-life come from neglect of simple cleanliness and ordinary bodily comforts, such as *homo sapiens* has become accustomed to from his cradle.

The subject of camping is really so vast that it cannot be even approached in a single article. It strikes at the very roots of life. At its best it holds up a mirror to us all, showing how far civilization and overpopulation have combined to separate us from the easy formula of life which the Creator in-

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tended; how they have driven thousands to starvation within a stone's throw of the fabulously rich, whereas Nature gave every man the equal strength of his own two hands, which were once ample to win him livelihood and happiness.

When one is hunting big game, or on a canoe trip, or such nomadic camp-life, the less of everything taken along the better. A good sleeping-bag is often preferable to a tent; a single skillet will provide the utensil to cook with; and rifle, axe, and knife are really all the necessities that can be mentioned. I even once went on a trip where I took *nothing* along except a note-book and two sheets of blank music-paper. A bully tramp over the mountains it was, too, and I slept in piles of leaves raked up in dry ravines that were already filled a solid foot deep with dry leaves. In my shooting-coat pockets were a Dutch wienerwurst, half a dozen hardtacks, three potatoes, and a hunk of bacon. In the ditty-bag, without which I never take any trip, were little primer-boxes filled with butter, salt, tea, and sugar, and there was also a variety of hooks and lines, a steel 'possum hook, and a pickerel hook for frogging. It was the only tramp in which I had no itinerary, hadn't any idea of getting anywhere, and could stop whenever and as long as I pleased. I think I was all one afternoon going two miles around the flank of one mountain, down into a ravine and up the brook

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to the spring, where I camped for the night. I was gone two days; bagged most of the species of trees of the Middle States east of the Appalachians in the note-book, and scrawled the music-sheets so full of wriggly black notes that the publisher got cross-eyed trying to read the copy. Such a camp-tramp cannot last more than two days, or you are apt to spend the night hugging a tree, while the rain deluges everything throughout the woods.

For little light week-end camps or fishing trips not lasting over ten days, I always take the little "Forester" tent described before in these pages. It is a cosey little forest home, no matter if it rains one day or the whole ten; it can be set up anywhere in less than ten minutes, and weighs only 4½ pounds. I always face it to the northeast, because most sudden thunder-squalls brew up from the southwest, and the hot sun is also in that direction, so that the tent gives a shady lounging-spot in its mouth where it is always cool and homely. An ideal spot to load shells, or mend tackle on lazy afternoons.

But the goal of camp-life is to arrange to spend the whole summer out-of-doors, beside some favorite lake or river. To most of us this must be somewhere within commuting distance of some large city. To a few it is given to be able to live thus in a good game country, leaving the business cares for the winter months. It is this kind of camp of which I wish

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particularly to speak, for it is an ideal life. Every morning the sun streaks through the trees, vivifying all the delicious night scents with a warmth and radiance that is pure joy to one who can spend his waking hours breathing the rich forest air; every night the moon makes pictures of lake and woods that live and live in one's memory long after more noted sights are forgotten; and every day that can be stolen from the city is one more store of golden hours for this, the most delightful of all plays.

No camp that is at all worthy of the name can be far from some open sheet of water, and water usually means plenty of bathing and bathing-suits, canoes, sunburn, fishing-tackle, and absolute cleanliness—blazing with health and wide-open pores. Even in the hunting season there is still the bath, and then the rub-down and the invigorating change into a clean flannel hunting-shirt, corduroys, and canvas. Keep in close touch with the water your camp is located beside, brothers, and you will never fly to the city for relief.

There is another brand of water, not so welcome or healthful as that which one bathes in, canoes in, and sails over, and whips for pickerel. I refer to the variety that comes a-rearin' and a-tearin' out of black, rolling clouds, along with enough wind to last twenty summers; ripping up tent-pegs, sinking boats, and wetting down everything not under

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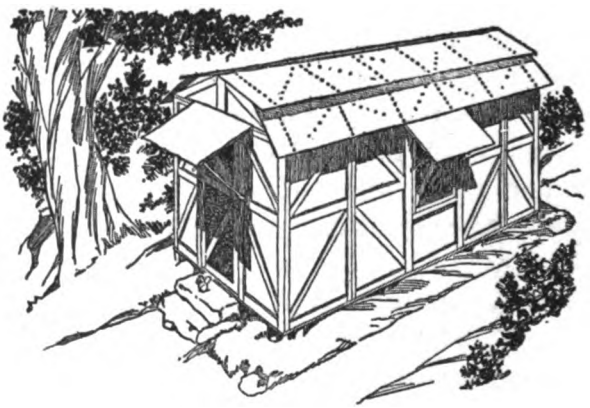
tarpaulins. This also numbers itself among the petty annoyances that drive the long-stay camper to the city, and the only way to beat him out in the long run is to make the camp just as near permanent as possible. If you can get a board floor, so much



A HUNTING-LODGE THAT CAN BE BROUGHT IN BY CANOE.

the better; but be very sure that none of the boards reach out from under the walls of the tent so that the water can follow them inside. The best way is to rent your ground, or buy it outright, with as much of the surrounding woods as you can afford, and buy or build a small bungalow. If you have the homing instinct you will get to love that little shack as you do your boyhood town, and will put in all sorts of spare hours and rainy days in improving it and making it more comfortable. The cheapest and

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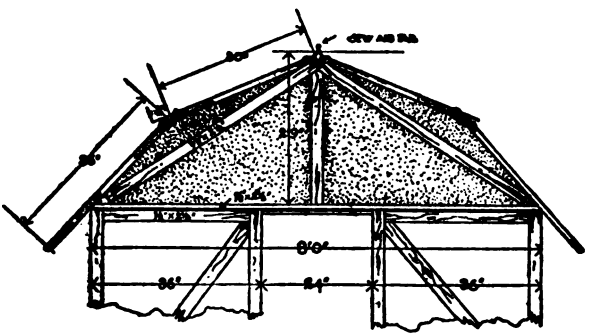
easiest transported one that I know of is to take a half-dozen rolls of ready roofing and some 2 x 1-inch hemlock joist into the woods with you, and build the shack yourself. It is surprising how far into the backwoods you can get with this load, given a couple of canoes and a day or so's time. Pick out a pictur-



DETAIL OF ROOF AND PANELS.

esque site, where the outlook will be a pleasure for many a serene hour to come, and back the shack up against a rocky slope or steep turn of the mountain-side with a southerly outlook. You will find that the 8 or 10 feet back of the house, between it and the wall, will soon grow into valuable "linter" and may some day afford possibility of a field-stone chimney, when you have the time and a canoe-load of quicklime brought out from the clearings. The frame panels will work out much as in the sketch. They are of the width of the roofing, 36 inches, and 7 feet

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high, diagonaled, as shown, to make them rigid, and the roofing is nailed to the backs of them.

A floor space of 8 by 14 feet is ample for a bungalow of this kind, with a gambrel roof as shown in the illustration. It will have a door in each end, a window at each side; doors and windows made of gauze tacked on the same framing as the main panels, canvas awnings and porches over windows and door, and a stone-and-concrete floor. To build it complete you will have to bring out into the woods six rolls of induroid or rubberoid roofing, costing two and a half cents a square foot, 100 square feet to the roll; 800 running feet of dressed No. 1 Southern pine, soft maple or hemlock, ⅞ x 2½ inches; 8 yards of bobbinet or gauze, 5 yards of 8-ounce duck canvas, and half a sack of Portland cement—not a very heavy layout of either money or material, say, twenty-five dollars all told, and yet it will give you a start for a permanent bungalow that you can always come back to with increasing affection. On arriving at your site, the first thing to do is to pitch your tents, select the very best site your ground affords for the shack, clear a little space to make panels in, and saw your pine up into the right lengths. You will need twelve panels 7 feet by 36 inches for the sides, and four panels 16 feet by 36 inches for the roof. Get out the walls first. They are quickly and strongly joined by driving in ½-inch corrugated

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iron fasteners, which are driven across the joints with a hammer, sinking them flush with the surface of the wood. In this way the whole twelve can be quickly and strongly knocked together. Tack the roofing material to the backs of the panels as fast as completed, as they are very wobbly and weak sideways without the material. This latter is gray in color, with a leathery surface, and in each roll come the needful nails and cement for joints, tin caps, etc. Space the nails about 3 inches and run the cement ahead as you nail. The hardware for this house will be two dozen stout iron hooks-and-eyes for the corners, and two dozen 3-inch iron flat hinges for doors, windows, and roof panels. Both hinges and nails are best galvanized.

Having the twelve panels to hand, the next step will be to nail a strip of pine 14 feet long to the top and bottom of each four panels, making two sides of four panels each, with a 2-foot window space in the middle of each. In the same way the two ends are assembled with strips of pine 8 feet long, nailed to top and bottom of two panels with a 2-foot door space in between. They are now ready to raise up, but first a foundation must be prepared, and the simplest one in the woods is made by driving in four 3-inch stakes about 3 feet long around all four sides, having two stakes at each corner. Saw them all off flat, to a string run all around and levelled at, say, 8 inches

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above the soil. On these the panels can be set up and hooked at the corners, nails being driven down through the foot strip into the posts. To make the corners stanch and tight, three cleats should be nailed to one of the panels, giving something for the hooks to pull against. There will be cracks at the corners and joints, and to protect these from the weather and at the same time guard against the inevitable warping of the joist in the weather, you had best hunt up straight 4-inch spruce or cedar saplings and flatten the backs true and set them up in front of the cracks, securing the panels to them with nails driven from the inside. The roof panels come next, 16 feet long by approximately 36 inches wide, a lap being left over as shown in the detail of the roof-joints, so as to leave no place for the rain to work in. There are twelve hinges, four at each joint, and the frame is diagonaled as with the wall panels. To get the roof on, lift it up on the walls, raise the ridge, until about a foot of eave overhangs at the sides, and nail light saplings to the ends to hold the gambrel in its proper position while the gable ends are measured and made. After putting them in position, the saplings can be knocked away and the weight of the roof allowed to come on the gables. Hooks will be needed at the eaves to utilize the top wall strip as a tie.

The doors are made just enough smaller than the

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opening to permit a sill and lintel of hemlock to be nailed in the doorway. They are covered on the inside with gauze or bobbinet, tacked to the frames with galvanized tacks. The windows are made in the same fashion except that the lower 3 feet is filled in with a solid panel of roofing material and a similar piece let in up above to permit the window to swing clear of the eaves. After swinging the door and window awnings with "rustic" frames cut in the woods, the house is ready for occupancy except for the floor. It is worth while to take along a can of the powder of some good cold-water paint, so as to finish off the woodwork of the panels. This in pure white gives excellent effects with the dark gray roofing, and, though the paint has a discouraging dirty-white appearance when first put on, it dries to a fine, tough white which will not rub or wash off.

The easiest way to make a floor in the woods is to choose some lazy afternoon when every one is tired of fishing and floor the whole of the shack with flat stones taken from the natural rock of the forest. Wash this over with an inch of thin, watery grout, of eight parts sand to one of cement, smoothing it with a straight-edge and trowel while the other fellow pours it from the pail. It will make a more durable, snake-proof, and vermin-proof floor than split logs or dirt.

Though the 3-foot window wainscot permits four cots to be arranged along the sides of the shack, I

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prefer to use this space for living-room, and sky the beds Pullman-car fashion, just a little under the roof. The easiest way to do it is to cut two straight 4-inch hemlocks, trim, and gain to posts set upright from the floor to ceiling against the front and rear walls. They thus make a sort of rustic inside door-jamb, so do not take any useful room, while the berths can be made in the space behind the 4-inch log by tacking across 10-ounce duck with 20-ounce galvanized iron tacks, spaced 3 inches apart. A spreader is let in at the middle, thus making two 6-foot berths on a side. They are filled with several inches of balsam browse and are then ready for the sleeping-bags. The whole floor space is, by this arrangement of sleeping accommodations, available for living-room; canvas camp-chairs, log tables, etc., can be put in and one has a comfortable lounging and eating room (in bad weather).

Such a bungalow, of course, has no fire any more than any summer cottage or seaside bungalow has, but while a canvas tent seems to have a way of getting cold after the sun goes down, the bungalow will hold its heat so as never to have the damp chill of the forest in it. It will be cold enough, however, for October and November hunting trips, so one should have in mind the construction of a stone-chimney at the first leisure week's-end trip to it. Take in a pail of quicklime and slack and mix a batch

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of three-to-one mortar with the lake sand. Build the chimney of forest stone so that its front face will come about 9 inches from the rear wall of the shack and fill in this space with logs and face with mortar. The hearth should be 2 feet by 10 inches deep, and the flue 8 inches square. The lintel over the hearth should be a long, flat stone, projecting well out so as to catch stray smoke, and the brow of it not over 3 feet from the hearth.

The principal use of such a woodland shack is in the promotion of what Dr. Van Dyke has aptly named "Days Off." Without it, many a holiday, especially the combination ones occurring on Thursday or Friday, when Saturday and Sunday are thrown in for good measure, are wasted because one feels more or less unprepared and disinclined to break a new trail for so short a time. But if it is merely a matter of packing some provisions and the sleeping-kit, whistling up the "pups," and taking a train to the nearest jumping-off place in the vicinity of "Loafer's Glory," or whatever you have named the shack, you will get out of it many a pleasant little outing, each one a diamond point in your memories.

The shack above described is only a unit. You will find it too small for a family camp and only really suitable as a hunting-lodge for yourself and a couple of men friends. But combined in various

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plans it offers possibilities for development into a real all-summer home that are not to be despised. For instance, presuming that you have been able to select enough level ground on your property to lay out a permanent summer home for three times the shack size, it will be your pleasure to bring out enough material for a duplicate shack. Place this one facing the other and at a distance of 12 feet away. On one side of the space between, build your field-stone chimney. You now have between the shacks space for a big lounging and living room, a sort of open porch which will become the dining-room and general assembly room of the camp, the two shacks being the wings. This centre room does not require anything like the protection against the weather or the finish demanded by the two wings. Logs or stone can be laid up for walls and a roof thrown over, rising higher than the roofs of the two wings and shedding its rain upon them. This centre roof may be a tarpaulin brought out from civilization and tacked taut over the log frame-work, or it may be of ready roofing tacked on permanently and left there season after season.

One of the wings can now be made entirely for sleeping purposes for the family, while the other wing is the combined kitchen and cook's sleeping quarters. The flooring is best in thin cement grout over the foundation of laid-in stones, the only

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material requiring to be brought in from civilization being a few bags of Portland cement. Decorate with antlers for gun racks arranged around the walls and rustic furniture manufactured on the site. This living-room soon becomes a very attractive summer lounging-place. The rear end of it should close up entirely on the chimney, all the light coming in from the front side. It should have a large 3-foot door and two side windows.

Another improvement in the shack can be had by bringing in non-rusting copper mosquito-netting and frame this in the windows in place of the salt-water type linen mosquito-netting originally used. In the following season, if it is possible to float a raft of tongued-and-grooved siding down the lake to the camp site, there is no reason why the entire interior of both wings should not be sheathed inside with siding or wainscoating running from floor to ceiling, leaving on the ready roofing outside for protection from the weather. This stiffens up the panels and takes out any bags which may have accumulated, and also renders them stout, to resist kicks and blows from the outside which sometimes, but rarely, might be perpetrated by some mischievous tramp who may pass your shack in the winter time. This same siding will be found advantageous as a further support to the roof against the sagging effect of winter snows.

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It has been claimed by some that ready roofing is not at all durable, but my own experience with it has been that, properly supported, it will last quite as long as any other material, being tougher and harder than most canvases or tarpaulins which are used for roofing purposes. There are many ways in which the roof panels can be stiffened in between the braces, if one employs his ingenuity on the materials already at hand in the forest. A good lattice of stout, straight shoots gathered in the forest in any thicket of yellow birch, sassafras, young hickories, and the like, can be worked in under the roof, or strips of bark can be slipped in between the frames and the roof to help stiffen it.

The beauty of making some sort of a beginning for a forest home is that each year it gets better and more serviceable as you return to it year after year for your summer outing and keep on fixing and improving it. It is one of the cheapest solutions of the summer home and the perennial summer problem yet devised.

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